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Volume 2

Vegetation Groups and Types

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VOLUME TWO

VEGETATION GROUPS AND TYPES

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ABSTRACT

The vegetation, its successional stages and its relationships with climate, soils and other landscape characteristics was studied as a part of a biophysical reconnaissance inventory of the southern Rocky Mountain Trench and the adjacent Rocky Mountains within British Columbia. The vegetation was sampled in over 1000 releves. For all releves information on soils, terrain and topography was recorded. For 80 of these releves soils were analyzed in detail in the laboratory.

The vegetation was classified for Forest Regions, Sections, Zones, Subzones and Vegetation Types. The study area is located mainly within the Dry Interior Region and includes parts of the Interior Wet Belt Region. The Dry Interior is represented by the Cranbrook Section and the Radium Section. For the study area 5 Forest Zones and 11 subzones were recognized. These categories and ecological landscape units are mapped and their significance for planning is discussed.

One hundred and thirty-eight vegetation types, climax and seral communities, are described. The function of soils, terrain, local climate and other characteristics in the ecosystems are discussed. The role of each vegetation type in succession is discussed. Resource values and constraints to use are determined for each type.

PREFACE 1984

This report is one of a series of Assessment and Planning Division (APD)[1] bulletins that describe an analyze the biophysical resources of the East Kootenay area. Individual bulletins focus on terrain, soils, climate, vegetation, wildlife, aquatics, and outdoor recreation, but are closely interrelated and rely on cross-referencing rather than duplication of material. A set of base data maps at a scale of 1:50 000 is also available for each discipline.

The East Kootenay study was initiated in 1975 in response to increasing pressure on land resources and the development of land-use conflicts. Forestry, mining, ranching, farming and tourism are all major contributors to the economic well being of the region. General population growth and maintenance of these industries requires that land be allocated for urban and industrial expansion and transportation corridors, and yet at the same time, areas be preserved for wildlife and recreational purposes.

The data, analyses, and interpretations that are contained within the East Kootenay bulletin and map series will assist in the development and implementation of a rational resource management policy. In addition, information is presented here that will increase systematic knowledge of the physical and biological components of land and water systems.

It is anticipate that careful utilization of this data base will ultimately aid the maintenance of a high quality environment in this part of British Columbia.

[1] These reports are now called Ministry of Environment Technical Reports. In the report, reference has been made to the Terrestrial Studies Branch, British Columbia Ministry of Environment. This branch is now called the Surveys and Resource Mapping Branch. Maps and reports for this study are available from Maps B.C., Surveys and Resource Mapping Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; (604) 387-1441.

PREFACE 1989

The author is now with the Wildlife Branch of the Ministry of Environment. This report was originally intended to have three volumes, but has now been reduced to two volumes.

ACKNOWLEDGEMENTS

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Larry Lacelle, Dennis Demarchi and Rod Chilton of the Assessment and Planning Division provided valuable information for correlation with soils, wildlife and climate, respectively.

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CHAPTER ONE

INTRODUCTION

The objective for this volume is to present summary descriptions of the Broad Groups and the Vegetation Types of the East Kootenay area and a key to these types. In Volume One study objectives are presented as well as a description of Forest Zonation and successional trends of the East Kootenay area.

CHAPTER TWO

DESCRIPTIONS OF THE BROAD GROUPS AND VEGETATION TYPES

2.1 BROAD GROUP DESCRIPTIONS

Nineteen Broad Groups of Vegetation Types are described. The Vegetation Types that make up the Broad Groups are described in Section 2.2. A key to the Broad Groups is presented in Section 3.1. The relationships of the Broad Groups is shown in Figure 2.1.

2.1.1 GROUP A: MATURE ALPINE FIR/ALPINE BLUE GRASS/BLUE-LEAVED CINQUEFOIL KRUMMHOLZ TYPES

(Types 1-8, 116)

This group is typified by krummholz vegetation with alpine fir, alpine blue grass, blue-leaved cinquefoil and spike trisetum. The types in this group are found at high elevations (above 1800 m) on shallow or deep colluvial and morainal materials. These areas are subjected to harsh climatic conditions and have short growing seasons.

The vegetation of this group is varied but usually the types have open forest or krummholz vegetation dominated by alpine fir with lesser amounts of alpine larch, whitebark pine and Engelmann spruce. Shrubs are sparse although shrubby cinquefoil is often found.

The herb layer usually includes sedges, Indian paintbrush, western yarrow, wild strawberry, sulphur hedysarum, spike trisetum, alpine timothy, blue-leaved cinquefoil, thread-leaved sandwort and alpine blue grass while often lance-leaved stonecrop, Sitka valerian, arrow-leaved ragwort, grouseberry and fireweed are present. The moss layer is usually poorly represented.

Found in this group and rarely found in other groups are alpine larch, shrubby cinquefoil, mountain-heather, alpine blue grass, thread-leaved sandwort, blue-leaved cinquefoil, spike trisetum and alpine timothy.

The areas with vegetation types of this group are valuable for recreation, wildlife habitat and watershed protection. These areas are generally quite sensitive as recovery after disturbance is slow because of the harsh climate. The vegetation is valuable for stabilizing the shallow soils which are frequently associated with types of this group.

2.1.2 GROUP B: MATURE ENGELMANN SPRUCE/ALPINE FIR/SMOOTH PACIFIC MENZIESIA/GROUSEBERRY FORESTED TYPES (Types 9-14)

This group is typified by maturing climax, forested vegetation of Engelmann spruce with an understory of smooth Pacific menziesia and grouseberry. The types in this group are found at moderate to high elevations (1450 m to 2150 m) usually on steep slopes of colluvial or morainal materials.

The vegetation found in these types usually have an open to dense tree cover (Type 13, though, has no trees) of alpine fir and Engelmann spruce frequently with lodgepole pine. The shrub layer is usually formed by smooth Pacific menziesia and white-flowered rhododendron with lesser amounts of black swamp gooseberry, Utah honeysuckle and black blueberry. Often, thin-leaved mountain alder, twinberry honeysuckle and blue elder are found. The herb layer usually is formed by grouseberry and heart-leaved arnica with lesser amounts of few-flowered one-sided wintergreen and western meadow-rue often with large-leaved rattlesnake orchid and green false hellebore. The moss layer is usually poorly represented but there may be a continuous cover dominated by common moss.

Found in this group and rarely found in Groups A and C are Engelmann spruce and alpine fir in the tree canopy, and white-flowered rhododendron, western meadow-rue, large-leaved rattlesnake orchid, few-flowered one-sided wintergreen and green false hellebore in the understory.

The types in this group generally have low forest productivity but may provide valuable wildlife cover and in more open forests, have good recreation values. The soils which this group is associated with are sensitive to erosion. The vegetation is valuable for soil stabilization.

2.1.3 GROUP C: YOUNG LODGEPOLE PINE/BIRCH-LEAVED SPIREA/GROUSEBERRY/FIREWEED OPEN FORESTED TYPES (Types 15-19)

This group is typified by young seral vegetation of lodgepole pine stands with birch-leaved spirea, grouseberry and fireweed. The types in this group are found at moderate to high elevations (1400 m to 2150 m) usually on steep slopes of colluvial or morainal materials.

This group is characterized by open forests dominated by lodgepole pine but rarely includes alpine fir. The shrub understory usually is composed of birch-leaved spirea, Utah honeysuckle, lodgepole pine, and alpine fir regeneration, often with black swamp gooseberry, twinberry honeysuckle, willows, black blueberry, whitebark pine and Engelmann spruce. Fireweed, grouseberry, Indian paintbrush, wild strawberry, pine grass, showy aster, heart-leaved arnica, wild rye grass and common pearly everlasting are regular components among the herbs. The moss layer is poorly represented.

Found in this group, but rarely found in Group B and Group D, are willows, Oregon boxwood, western yarrow, Indian paintbrush and hawkweed. Rarely found in Group B, but found here, are birch-leaved spirea, trembling aspen (shrub layer), whitebark pine, soopolallie, subalpine fleabane and common harebell.

The soils on which these types are found generally are dry due to rapid runoff on steep slopes. The vegetation on these sites is valuable in preventing erosion on steep slopes. Forestry values are generally low as productivity is limited by low soil moisture availability.

2.1.4 GROUP D: MATURE LODGEPOLE PINE/SMOOTH PACIFIC MENZIESIA/GROUSEBERRY/COMMON MOSS FOREST TYPES (Types 20-29)

This group is typified by maturing seral vegetation of lodgepole pine and Engelmann spruce in the tree layer and an understory of smooth Pacific menziesia, Utah honeysuckle, grouseberry and moss. The types in this group are found at middle to high elevations (1250 m to 1900 m) usually on steep slopes of colluvial and morainal materials. Moisture availability is good and it is reflected in rich shrub and herb growth.

The vegetation in this group usually has open to dense tree cover dominated by lodgepole pine, Engelmann spruce and/or alpine fir. The shrubs are usually dominated by smooth Pacific menziesia and Utah honeysuckle with lesser amounts of black swamp gooseberry, twinberry honeysuckle, thin-leaved mountain alder, birch-leaved spirea and alpine fir and Engelmann spruce regeneration. The herbs usually include grouseberry, northern twinflower, Canadian bunchberry and heart-leaved arnica with lesser amounts of showy aster, few-flowered one-sided wintergreen, western meadow-rue, fireweed and green pyrola. The moss carpet is usually continuous and it is dominated by common moss, feather moss, cushion moss and layered moss.

Found in this group and rarely found in Group C are thin-leaved mountain alder, smooth Pacific menziesia, dwarf scouring-rush, Canadian bunchberry, northern twinflower and a dense moss cover.

Found in this group and rarely found in Group E are thin-leaved mountain alder, green pyrola, false Solomon's-seal and mountain sweetcicely.

The types of this group generally have moderate forest productivity. The vegetation is valuable for stabilizing the soils and preventing erosion on the steep slopes associated with this group. The vegetation is generally appealing for recreation due to the diversity of shrub and herb species present.

2.1.5 GROUP E: MATURE ENGELMANN SPRUCE/TWINBERRY HONEYSUCKLE/CANADIAN BUNCHBERRY/COMMON MOSS FOREST TYPES (Types 30-34)

This group is typified by maturing seral stands of Engelmann spruce or lodgepole pine with an understory of Utah honeysuckle, twinberry honeysuckle, Canadian bunchberry and common moss. The types in this group are found at moderate elevations (1250 m to 1700 m) usually on moderate to steep slopes with fluvial, colluvial or morainal materials. Moisture availability is favourable as is reflected in the rich growth of herbs.

The vegetation of this group usually consists of open to dense coniferous forest dominated by Engelmann spruce with lesser amounts of lodgepole pine and alpine fir. The shrubs usually include twinberry honeysuckle, soopolallie, and Engelmann spruce and alpine fir regeneration. Smooth Pacific menziesia, black swamp gooseberry and common juniper often occur as well. Among the herbs usually Canadian bunchberry, northern twinflower, few-flowered one-sided wintergreen, grouseberry, wild strawberry and heart-leaved arnica occur. Often, western meadow-rue, western mountainbells and dwarf scouring-rush are found. The moss carpet is always well represented and it is dominated by common moss, feather moss and layered moss.

Found in this group and rarely found in Group D are soopolallie and common Labrador tea.

Found in this group and rarely found in Group F are soopolallie, common Labrador tea, twinberry honeysuckle, wild strawberry, western mountainbells and dwarf scouring-rush.

The types in this group generally have good forest productivity. The vegetation is generally appealing for recreation due to lush herb growth. Sites on steep slopes may be sensitive to erosion and the vegetation is valuable in preventing this.

2.1.6 GROUP F: YOUNG TO MATURE LODGEPOLE PINE/WESTERN RED CEDAR/UTAH HONEYSUCKLE/HEART-LEAVED ARNICA FOREST TYPES (Types 35-39)

This group is typified by various aged seral communities dominated by lodgepole pine or Engelmann spruce in the tree canopy with an understory of Utah honeysuckle and heart-leaved arnica. Often western red cedar is regenerating underneath the tree canopy. The types in this group are found at middle elevations (1000 m to 1950 m) on gentle to steep slopes of morainal, colluvial, fluvial or lacustrine materials. The types of this group occur in areas of relatively high precipitation.

The vegetation found in this group has an open to dense tree cover dominated by lodgepole pine, Engelmann spruce or alpine fir. The shrub understory usually is formed by Utah honeysuckle, smooth Pacific menziesia, black blueberry, birch-leaved spirea, Oregon boxwood, and alpine fir and Engelmann spruce regeneration. Western thimbleberry, Rocky Mountain maple, Sitka mountain-ash and western red cedar are often present. Western hemlock regeneration is sometimes present. The herbs usually include heart-leaved arnica, large-leaved rattlesnake orchid, northern twinflower, few-flowered one-sided wintergreen and blue-bead clintonia. Canadian bunchberry, common western pipsissewa, western meadow-rue, grouseberry, unifoliate-leaved foamflower and oak fern are often present. Mosses are usually poorly represented but common moss may be found.

Found in this group but rarely in Group E are western red cedar, black blueberry, blue-bead clintonia, unifoliate-leaved foamflower and oak fern.

Found in this group, but rarely in Group G are western red cedar and Rocky Mountain maple.

Because of relatively high precipitation these types generally have good forest productivity. Wildlife forage values are relatively low as are recreational values. The types of this group are uncommon in the study area.

2.1.7 GROUP G: YOUNG TO MATURE ROCKY MOUNTAIN DOUGLAS-FIR/SOOPOLALLIE/PINE GRASS FOREST TYPES (Types 40-44, 115)

This group is typified by young to maturing seral stands dominated by Rocky Mountain Douglas-fir, lodgepole pine or western larch in the tree layers with an understory of soopolallie, birch-leaved spirea and pine grass. The types in this group are found at low to middle elevations (850 m to 1700 m) on gentle to steep slopes of various soils and materials.

The forest stands of this group generally are closed. The shrubs usually include soopolallie, birch-leaved spirea and creeping Oregon-grape. Often found are common juniper, common saskatoon, Rocky Mountain maple, and Rocky Mountain Douglas-fir or Engelmann spruce regeneration. The herbs usually include pine grass, heart-leaved arnica and northern twinflower, and often wild strawberry, showy aster, common western pipsissewa, Canadian bunchberry, few-flowered one-sided wintergreen and fireweed. The mosses are usually poorly represented.

Found in this group, but rarely in Group F, are trembling aspen, creeping Oregon-grape, western yarrow and wood strawberry.

Found in this group, but rarely in Group H, are trembling aspen, Rocky Mountain maple, creeping Oregon-grape, Oregon boxwood, western yarrow and wood strawberry.

These types generally have moderate to good tree productivity and relatively good regeneration. Wildlife and recreation values are generally low.

2.1.8 GROUP H: MATURE LODGEPOLE PINE/BIRCH-LEAVED SPIREA/PINE GRASS/HEART-LEAVED ARNICA FOREST TYPES (Types 45-53, 121)

This group is typified by young to maturing seral stands dominated by lodgepole pine, birch-leaved spirea, pine grass and heart-leaved arnica. The types in this group are found at moderate elevations (1050 m to 1850 m), usually on moderate to steep slopes of various soil materials.

The vegetation types of this group usually have closed tree stands dominated by lodgepole pine sometimes with Rocky Mountain Douglas-fir. The shrub understory is usually formed by birch-leaved spirea, soopolallie, Utah honeysuckle and Engelmann spruce and alpine fir regeneration. Common saskatoon, roses, willows and western thimbleberry are often present. The herbs usually include pine grass, heart-leaved arnica, northern twinflower, showy aster, common western pipsissewa and few-flowered one-sided wintergreen. Wild strawberry, large-leaved rattlesnake orchid, Canadian bunchberry, western meadow-rue, fireweed, green pyrola and evergreen yellow violet are often present. Mosses are often well represented and dominated by common moss.

Found in this group, but rarely found in Group G, are green pyrola, evergreen yellow violet and northwestern sedge.

Found in this group, but rarely in Group I, are thin-leaved mountain alder, western thimbleberry, rose, evergreen yellow violet, hawkweed and northwestern sedge.

Tree productivity is relatively good due to favourable available moisture. Recreation and wildlife values are relatively low.

2.1.9 GROUP I: YOUNG TO MATURE LODGEPOLE PINE/SOOPOLALLIE/PINE GRASS/DWARF BLUEBERRY/COMMON MOSS FOREST TYPES (Types 54-60)

This group is typified by various aged seral stands of lodgepole pine with an understory of soopolallie, roses, pine grass, dwarf blueberry and common moss. The types in this group are found at low to middle elevations (900 m to 1800 m) often on gentle slopes of various parent materials.

The vegetation of this group consists of dense forests, usually dominated by lodgepole pine or sometimes by Rocky Mountain Douglas-fir. The shrubs usually include soopolallie, roses, birch-leaved spirea and Rocky Mountain Douglas-fir regeneration. Often present are common juniper, common saskatoon, creeping Oregon-grape, Utah honeysuckle and Engelmann spruce regeneration. The herbs usually include pine grass, wild strawberry, showy aster, heart-leaved arnica, northern twinflower and dwarf blueberry. Often kinnikinnick, Canadian bunchberry, few-flowered one-sided wintergreen and fireweed occur. The mosses are often well represented and dominated by common moss and feather moss.

Found in this group and rarely found in Group H are trembling aspen, white spruce, dwarf blueberry and kinnikinnick.

Found in this group and rarely found in Group J are Rocky Mountain Douglas-fir (tree canopy) and grouseberry.

The types of this group generally have moderate tree productivity. Growth may be restricted by droughty conditions associated with coarse-textured soils. These sites are generally good for campsite development when the vegetation is associated with gentle slopes or level areas. Wildlife values are generally low.

2.1.10 GROUP J: YOUNG TO MATURE LODGEPOLE PINE/BIRCH-LEAVED SPIREA/PINE GRASS/NORTHERN TWINFLOWER/COMMON MOSS FOREST TYPES (Types 61-66)

This group is typified by young and maturing seral stands of lodgepole pine with an understory of soopolallie, birch-leaved spirea, pine grass, northern twinflower and common moss. The types of this group are found at moderate elevations (950 m to 1450 m) usually on gentle slopes of various parent materials.

The vegetation in this group is dominated by closed forest stands of lodgepole pine. The shrub understory usually has soopolallie, birch-leaved spirea, roses, common snowberry and common saskatoon. Common juniper, creeping Oregon-grape, Utah honeysuckle, and alpine fir and Engelmann spruce regeneration are often present. The herbs usually include pine grass, northern twinflower, wild strawberry, heart-leaved arnica, common western pipsissewa, few-flowered one-sided wintergreen and dwarf blueberry. Often present are dwarf red blackberry, showy aster, large-leaved rattlesnake orchid, Canadian bunchberry, fireweed, green pyrola, false Solomon's-seal, northern bedstraw and rough-leaved rice grass. Mosses are usually well represented and common moss, feather moss and layered moss dominate.

Found in this group but rarely found in Group I are dwarf red blackberry, hawkweed, rough-leaved rice grass, rough-fruited fairybells, false Solomon's-seal and mountain sweetcicely.

Found in this group and rarely found in Group K are lodgepole pine, Engelmann spruce (regeneration), soopolallie, common juniper, pine grass, hawkweed, kinnikinnick, northwestern sedge, dwarf blueberry and northern bedstraw.

Tree productivity is generally good due to a favourable moisture supply. Recreation and wildlife values are relatively low.

2.1.11 GROUP K: MATURE WESTERN RED CEDAR/WHITE SPRUCE/WESTERN THIMBLEBERRY/SWEET-SCENTED BEDSTRAW FOREST TYPES (Types 67-69)

This group is typified by edaphic climax (or seral stages) of western red cedar, white spruce or Rocky Mountain Douglas-fir and an understory of western thimbleberry and sweet-scented bedstraw. The types of this group are found at moderate elevations (850 m to 1350 m) on level to steep slopes often of fluvial material but frequently of other parent materials. Moisture availability is good as the types in this group are usually found in lower slope positions.

The vegetation of this group consists of dense coniferous or mixed forests with western red cedar or white spruce and often common paper birch. The shrub understory usually is composed of western thimbleberry and Rocky Mountain maple and often birch-leaved spirea, creeping Oregon-grape, common snowberry, Oregon boxwood and western red cedar regeneration are present. The herbs usually include sweet-scented bedstraw and mountain sweetcicely often with Canadian bunchberry, blue-bead clintonia, false Solomon's-seal and Douglas' aster. Mosses are generally poorly represented.

Found in this group and rarely in Group J are western red cedar (tree layer), Rocky Mountain maple, Oregon boxwood, cucumberroot twistedstalk, oak fern and star-flowered false Solomon's-seal.

Found in this group but rarely in Group L are western red cedar, Rocky Mountain maple, western thimbleberry, Oregon boxwood, blue-bead clintonia, cucumberroot twistedstalk and oak fern.

The types in this group generally have good forest productivity due to favourable moisture and nutrient availability. Wildlife values are generally low. These types are relatively rare in the study area.

2.1.12 GROUP L: YOUNG TO MATURE SPRUCE/WESTERN RED-OSIER DOGWOOD/WILD RYE GRASS FOREST TYPES
(Types 70-77, 112, 113, 114)

This group is typified by edaphic climax (or seral stages) dominated by white spruce, Engelmann spruce or trembling aspen with an understory of western red-osier dogwood and wild rye grass. The types of this group are found at low to moderate elevations (750 m to 1550 m) on valley bottom or lower slope positions, generally on level areas of fluvial or lacustrine parent materials. These sites have good moisture availability as is reflected in good tree and lush herb growth.

The vegetation in this group is usually dominated by dense forest stands. The shrub understory usually includes western red-osier dogwood, common snowberry and willows and often common saskatoon is present. The herbs usually include wild rye grass and often wild strawberry, Canadian bunchberry, northern twinflower, western meadow-rue, sweet-scented bedstraw, mountain sweetcicely, northern bedstraw, Douglas' aster, rough-leaved rice grass and star-flowered false Solomon's-seal. Mosses are usually poorly represented.

Found in this group but rarely in Group K are trembling aspen, soopolallie, common juniper, cream-colored peavine and dwarf red blackberry.

Found in this group but rarely in Group M are Engelmann spruce, willows, western red-osier dogwood, white spruce (regeneration), high bush cranberry, black swamp gooseberry, twinberry honeysuckle, western meadow-rue, wild rye grass, sweet-scented bedstraw, mountain sweetcicely, rough-leaved rice grass, wild sarsaparilla, Canadian bunchberry, dwarf red blackberry and common horsetail.

The types in this group generally have good tree productivity due to a favourable moisture supply. Wildlife browse values are relatively good. The vegetation is quite lush with a high diversity of plants although a dense shrub layer may cause low trafficability. Since these sites are generally associated with rivers or creeks the vegetation may be valuable for preventing erosion and siltation.

2.1.13 GROUP M: YOUNG TO MATURE ROCKY MOUNTAIN DOUGLAS-FIR/BIRCH-LEAVED SPIREA/PINE GRASS/KINNIKINNICK FOREST TYPES (Types 78-83)

This group is typified by various aged seral (sometimes climatic climax) stands of Rocky Mountain Douglas-fir with an understory of birch-leaved spirea, pine grass and kinnikinnick. The types in this group are found at low to middle elevations (750 m to 1600 m) on gentle to steep-sloped areas of various parent materials.

The vegetation consists of closed stands of Rocky Mountain Douglas-fir. The shrubs usually include common juniper, soopolallie, birch-leaved spirea, common saskatoon, creeping Oregon-grape and common snowberry. Pine grass, kinnikinnick and wild strawberry often with heart-leaved arnica, showy aster, western yarrow and northern bedstraw are characteristic herbs. The mosses are usually poorly represented.

Found in this group but rarely found in Group L are Rocky Mountain Douglas-fir, birch-leaved spirea, common juniper, nodding onion, hawkweed, western yarrow, kinnikinnick, pine grass, heart-leaved arnica, racemose pussytoes, timber milk-vetch, yellow penstemon, three-spot mariposa lily, round-leaved alumroot.

Found in this group but rarely found in Group N are common juniper, hawkweed, racemose pussytoes, timber milk-vetch and northern bedstraw.

Tree productivity is moderate and is limited by moisture deficits in summer months. Wildlife and cattle grazing values are low to moderate, as some browse and grazing species are available. Recreation values are relatively low.

2.1.14 GROUP N: YOUNG TO MATURE ROCKY MOUNTAIN DOUGLAS-FIR/CREEPING OREGON-GRAPE/PINE GRASS/HEART-LEAVED ARNICA FOREST TYPES (Types 84-89)

This group is typified by various aged seral and climax stands with a tree layer of Rocky Mountain Douglas-fir with an understory of creeping Oregon-grape, pine grass and heart-leaved arnica. The types of this group are found at low to moderate elevations (750 m to 1900 m), usually on steep slopes which may have various parent materials.

The vegetation consists of dense forest stands of Rocky Mountain Douglas-fir often with lodgepole pine. The shrubs usually include creeping Oregon-grape, birch-leaved spirea and Rocky Mountain Douglas-fir regeneration. Often common saskatoon and common snowberry are present. The herbs are species poor and usually include pine grass, heart-leaved arnica and kinnikinnick. Often western yarrow and wild strawberry are present. Mosses are usually poorly represented.

Found in this group but rarely in Group M is northern twinflower.

Found in this group but rarely found in Group O are northern twinflower and cream-colored peavine.

Tree productivity is moderate and is limited by moisture deficits in summer months. Wildlife and cattle grazing values are low. Recreation values are relatively low. Sites with these types of vegetation may be sensitive to erosion as they are commonly associated with steep slopes.

2.1.15 GROUP O: YOUNG LODGEPOLE PINE/SOOPOLALLIE/PINE GRASS/NODDING ONION FOREST TYPES (Types 90-95)

This group is typified by young, seral stands with low trees dominated by lodgepole pine, Rocky Mountain Douglas-fir or trembling aspen with an understory of soopolallie, pine grass and western yarrow. The types of this group are found from low to high elevations (700 m to 2200 m). At higher elevations these types may be associated with steep slopes, shallow soils and sun exposure.

The vegetation consists of open forest stands. The shrubs usually include soopolallie and

Wood's rose, and often common juniper, birch-leaved spirea, common saskatoon, creeping Oregon-grape, trembling aspen, and Rocky Mountain Douglas-fir regeneration are present. Usually pine grass and western yarrow and often nodding onion, kinnikinnick, wild strawberry, showy aster, sulphur hedysarum, common harebell and timber milk-vetch make up the herbaceous understory. Mosses are poorly represented.

Found in this group but rarely in Group N are willows, lodgepole pine (shrub layer), trembling aspen (shrub layer), sulphur hedysarum, common harebell, timber milk-vetch and yellow penstemon.

Found in this group but rarely in Group P are western larch, lodgepole pine, willows, showy aster and dwarf blueberry.

This group generally has poor tree productivity due to moisture deficits. Wildlife and cattle grazing values are low to moderate as some valuable browse and grazing species are present. Recreation values are relatively low. When this type is associated with steep slopes, shallow soils or sun exposure the sites are quite sensitive and the vegetation is valuable for erosion prevention. Revegetation may be slow after disturbance on such sites.

2.1.16 GROUP P: YOUNG TO MATURE ROCKY MOUNTAIN DOUGLAS-FIR/PONDEROSA PINE/COMMON SASKATON/PINE GRASS/ROUGH FESCUE OPEN FOREST TYPES (Types 96, 97, 111, 117)

This group is typified by young and maturing seral stands of Rocky Mountain Douglas-fir and ponderosa pine and an understory of common saskatoon, pine grass and rough fescue. The types of this group are found at low elevations (600 m to 1350 m) mainly on fluvial materials but they also occur on other parent materials.

The vegetation is dominated by open forest stands of Rocky Mountain Douglas-fir and ponderosa pine. The shrub layer usually has common saskatoon and Rocky Mountain Douglas-fir regeneration often with birch-leaved spirea, Wood's rose and antelopebush. The herbs usually include pine grass, rough fescue, western yarrow, wild strawberry, timber milk-vetch and yellow penstemon. Often Indian paintbrush, field pussytoes, nodding onion, hawkweed, kinnikinnick, Columbia gromwell, prairie crocus, prairie koeleria, bluebunch wheat grass, yellow salsify and Kentucky blue grass are found. Mosses are rarely present.

Found in this group but rarely found in Group O are antelopebush, ponderosa pine (shrub layer), rough fescue, arrow-leaved balsamroot, Columbia gromwell, prairie crocus, prairie koeleria, bluebunch wheat grass, Holboell's rock cress, slender hawk's beard, yellow salsify and hairy golden-aster.

Found in this group but rarely found in Group Q are timber milk-vetch, yellow penstemon and hairy golden-aster.

Tree productivity and establishment are inhibited by severe moisture deficits. The types in this group generally have good grazing and browse values. Areas with this kind of vegetation often are good wildlife winter range. Recreation values are enhanced by open to closed forest stands in a mosaic pattern.

2.1.17 GROUP Q: YOUNG TO MATURE PONDEROSA PINE/ANTELOPEBUSH/BLUEBUNCH WHEAT GRASS/PRAIRIE KOELERIA OPEN FOREST TYPES (Types 98-103, 135)

This group is typified by various aged seral stands of ponderosa pine and Rocky Mountain Douglas-fir and an understory of antelopebush, common saskatoon, prairie koeleria and bluebunch wheat grass. The types of this group are found at low elevations (650 m to 1300 m) often on fluvial or lacustrine materials.

The vegetation is dominated by open forest stands. The shrubs usually include common saskatoon. Often antelopebush, common juniper, snowbush ceanothus and Rocky Mountain Douglas-fir regeneration are present. Usually bluebunch wheat grass, prairie koeleria, western yarrow and kinnikinnick and often field pussytoes, wild strawberry, pine grass and yellow penstemon make up the herbaceous cover. Mosses are rare.

Found in this group but rarely in Group P are western needle grass, small-flowered blue-eyed Mary, desert parsley, spreading phlox, American vetch, Douglas' aster and old man's whiskers.

Found in this group but rarely in Group R are spreading phlox, field pussytoes and yellow penstemon.

Tree productivity and establishment are inhibited by severe moisture deficits. The types in this group generally have good grazing and browse values. Areas with this kind of vegetation have moderate to good wildlife winter range. Recreation values are enhanced by a mosaic pattern of open to closed forest stands.

2.1.18 GROUP R: YOUNG TO MATURE COMMON SASKATOON/COMMON SNOWBERRY/PRAIRIE KOELERIA SHRUB-GRASSLAND TYPES (Types 104-110, 118-120, 136-138)

This group is typified by various aged (pioneer to overmature) seral stands of savannah, grassland or open forests of ponderosa pine and Rocky Mountain Douglas-fir and an understory of common snowberry, common saskatoon, prairie koeleria and yellow salsify. The types in this group are found at low elevations (750 m to 1000 m) usually on gentle-sloped valley bottom areas of fluvial or lacustrine parent materials.

The vegetation is either dominated by shrubs or grasses or has parkland forest cover of ponderosa pine and Rocky Mountain Douglas-fir. The shrubs often include common snowberry, common saskatoon, Wood's rose and Rocky Mountain Douglas-fir regeneration. Sometimes common juniper, antelope-bush, redstem ceanothus and ponderosa pine are present.

The herbs usually include prairie koeleria. Often present are yellow salsify, common dandelion, western yarrow, timber milk-vetch, rough fescue, three-spot mariposa lily, bluebunch wheat grass, Idaho fescue, western needle grass, blue grass, slender hawk's-beard, Pacific anemone, Nuttall's pussytoes, narrow-leaved lomatium, hairy golden-aster, shaggy fleabane and drooping brome grass. Mosses are uncommon.

Found in this group and rarely found in Group Q are Nuttall's pussytoes, narrow-leaved lomatium and drooping brome grass.

The types in this group have poor forest productivity and poor potential for tree regeneration. The types in this group generally have good grazing and browse values. Areas with vegetation of these types are usually valuable wildlife winter range as well as being valuable for cattle grazing. Recreation values are enhanced by a mixture of parkland, open and closed forests. These areas may be extremely sensitive, particularly if found on steep slopes, shallow or coarse-textured soils or on areas with sun exposure, as severe moisture deficits, high lime content in the soil and high surface temperatures inhibit establishment and growth of plants. The rate of succession is slow.

2.1.19 GROUP S: NON-FORESTED WETLAND, MEADOW, PIONEER AND HIGH ELEVATION VEGETATION TYPES (Types 122-134)

This group includes types that lack trees. These types are found on various diverse habitats. Although the vegetation of these types is not similar they have been grouped for convenience of presentation.

They include:

122	wetland vegetation dominated by rushes
123	a low elevation meadow with common silverweed and sedges
124	a low elevation meadow with common silverweed and common timothy
125	gravel bar vegetation with western birch and creek goldenrod
126	gravel bar vegetation with willows and yellow mountain-avens
127	wetland vegetation dominated by willows and sedges
128-129	avalanche areas dominated by alders and herbs
130	alpine tundra dominated by herbs
131	a high elevation meadow with diamond willow and sedges
132	a high elevation flower meadow
133-134	krummholz areas dominated by mountain-heather and grouseberry

Most of these types have high browse and grazing values and provide valuable wildlife habitat. These areas generally have high recreation value as the vegetation is non-forested, attractive and frequently closely associated with closed forested areas.

2.2 VEGETATION TYPE DESCRIPTIONS

One hundred and thirty-eight vegetation types, arranged in 19 broad groups, are described. The habitat and vegetation are characterized in summary descriptions. More complete information on species composition and habitat from plot data for each type may be obtained from the Terrestrial Studies Branch.

Within each Species Composition box, a dash indicates absence of species for that layer. The moss, lichen and liverwort layer is an exception to this rule. During the field study, information on moss species was not collected consistently. Thus a dash placed in this layer may imply either absence of species or that information is lacking. The Character Species are the species used to differentiate a type from similar types with which it might be confused. Character Species listed as present are lacking from similar types while those listed are absent are lacking from the type but are present in similar types of a particular Broad Group. The categories and information used in the type descriptions are explained in Appendix A.

The Vegetation Types have been related to successional trends in the study area (see Volume One, Chapter Three). A knowledge of vegetation-soils relationships and the tables of successional trends will allow prediction of what vegetation may be obtainable through management on a particular unit. A Successional Sequence Number is given for most vegetation types and this corresponds to the sequences given in Volume One, Chapter Three.

A species list is provided in Appendix D. Species names follow nomenclature used by Taylor and MacBryde (1977).

Plate 2.1 Group A. 1) Alpine fir - white-flowered rhododendron - grouseberry - Sitka valerian. The vegetation of this site is dominated by Engelmann spruce, alpine fir, white-flowered rhododendron and a dense cover of grouseberry. It is on a southeast-facing colluvial slope at 2050 m.

Plate 2.2 Group A. 5) Whitebark pine - grouseberry - round-leaved alumroot. The vegetation of this site is dominated by alpine fir, whitebark pine and white mountain-avens on a west-facing slope with shallow colluvium at 2400 m.

1	Alpine fir - white-flowered rhododendron - grouseberry - Sitka valerian (see Plate 2.1)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine and krummholz

Successional stage: maturing seral to climatic climax
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (25)	alpine fir Engelmann spruce	10 10	whitebark pine alpine larch	3 3
Tall shrub layer (20)	alpine fir	15	Engelmann spruce	3
Low shrub layer (25)	white-flowered rhododendron alpine fir black blueberry	10 5 5	whitebark pine alpine larch	3 3
Herb layer (50)	grouseberry Sitka valerian	40 5	sedges spike trisetum subalpine fleabane yellow glacier lily	3 3 3 3
Moss, lichen and liverwort layer (5)	-		-	

CHARACTER SPECIES

Present	Absent
alpine fir Engelmann spruce black blueberry white-flowered rhododendron Sitka valerian bracted lousewort	Rocky Mountain Douglas-fir thin-leaved mountain alder bluebunch wheat grass

TERRAIN AND SOILS

Terrain: deep or shallow soils of upper mountain slopes; colluvial veneer and blanket, morainal
Soil Texture: silt loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1800-2400 m
Slope: various
Aspect: various
Landscape position: upper slope

ECOLOGY

- high snowfall, cold temperatures
- short growing season
- drought in summer for areas with shallow soils

SUCCESSION

- relatively slow rate of succession due to climate of cold temperatures and long snow duration
- succession may be further inhibited on sites with shallow soils because of summer drought

2	White mountain-avens - blue-leaved cinquefoil - alpine blue grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Krummholz

Successional stage: pioneer seral
Stand appearance: krummholz and tundra

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (3)	-		alpine fir whitebark pine	3 3
Herb layer (15)	white mountain-avens sedges	10 5	blue-leaved cinquefoil	3
Moss, lichen and liverwort layer (10)	lichens	10	-	

CHARACTER SPECIES

Present	Absent
white mountain-avens	Engelmann spruce smooth Pacific menziesia white-flowered rhododendron spike trisetum grouseberry

TERRAIN AND SOILS

Terrain: morainal blanket, colluvial veneer

Soil Texture: sandy loam
Soil Association Comp: MP_7, RA_2
Moisture regime: subxeric
Drainage: rapid

TOPOGRAPHY

Elevation: 2300-2450 m
Slope: 3-9%
Aspect: various
Landscape position: upper slope, exposed ridges

ECOLOGY

- usually found on exposed ridges with harsh conditions
- shallow soil and wind exposure creates low moisture availability throughout growing season

SUCCESSION

-extremely slow rate of succession because of harsh climate, shallow soil and summer drought

3	Grouseberry - wild strawberry - western pasqueflower

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Krummholz

Successional stage: maturing edaphic climax
Stand appearance: meadow

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (3)	-		Engelmann spruce	3
Tall shrub layer (0)	-		-	
Low shrub layer (10)	shrubby cinquefoil	5	alpine fir Engelmann spruce	3 3
Herb layer (35)	grouseberry sedges	10 15	wild strawberry arrow-leaved ragwort alpine timothy western pasqueflower	3 5 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
shrubby cinquefoil western pasqueflower wild strawberry	alpine larch smooth Pacific menziesia white-flowered rhododendron sulphur hedysarum lance-leaved stonecrop

TERRAIN AND SOILS

Terrain: cirques and high mountain valleys; colluvial veneer and blanket, morainal veneer and blanket
Soil Texture: silt loam to clay loam
Soil Association Comp: wide range of soils
Moisture regime: subhygric to hygric
Drainage: moderately well to imperfect

TOPOGRAPHY

Elevation: 2300-2450 m
Slope: 4-20%
Aspect: various
Landscape position: upper slope, concave sites

ECOLOGY

- moisture rich hollows with dense herbaceous growth
- rich nutrients from seepage

SUCCESSION

-edaphic climax vegetation on snowbank meadow
-relatively fast succession after disturbance because of favourable moisture

4	White mountain-avens - sedge - spike trisetum

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Alpine tundra, Subalpine Engelmann spruce - alpine fir
Subzone: Krummholz

Successional stage: maturing edaphic or climatic climax
Stand appearance: meadow, alpine tundra

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (3)	-		alpine larch	3
Herb layer (30)	white mountain-avens sedges	10 10	alpine blue grass spike trisetum northern goldenrod one-flowered cinquefoil	3 3 5 3
Moss, lichen and liverwort layer (5)	lichens	5	-	

CHARACTER SPECIES

Present	Absent	
white mountain-avens spike trisetum alpine blue grass	alpine fir Engelmann spruce whitebark pine shrubby cinquefoil white-flowered rhododendron grouseberry	western yarrow

TERRAIN AND SOILS

Terrain: ridges with shallow soils; morainal or colluvial veneer
Soil Texture: loam to sandy loam
Soil Association Comp: MP_7, RJ_4
Moisture regime: mesic to submesic
Drainage: well

TOPOGRAPHY

Elevation: 2350-2700 m
Slope: 3-15%
Aspect: various
Landscape position: upper slope

ECOLOGY

- severe climate with short growing season
- moisture deficits in growing season
- active weathering of rock forming shallow veneer of soils

SUCCESSION

-extremely slow rate of succession due to severe climate, shallow soils and summer drought

5	Whitebark pine - grouseberry - round-leaved alumroot (Plate 2.2)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing climatic climax
Stand appearance: Krummholz

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Krummholz

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (20)	alpine fir	10	Engelmann spruce whitebark pine alpine larch	3 5 3
Low shrub layer (20)	alpine fir	15	common juniper whitebark pine	3 3
Herb layer (40)	grouseberry sedges	20 10	round-leaved alumroot blue-leaved cinquefoil northern goldenrod thread-leaved sandwort	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
whitebark pine	white-flowered rhododendron
fireweed	smooth Pacific menziesia
grouseberry	bluebunch wheat grass
round-leaved alumroot	arrow-leaved ragwort
western yarrow	alpine timothy
blue-leaved cinquefoil	

TERRAIN AND SOILS

Terrain: deep or shallow soils of upper mountain slopes; colluvial veneer and blanket, morainal
Soil Texture: sandy loam to loam
Soil Association Comp: MP_3, RA_2, RA_5, RA_7
Moisture regime: mesic to submesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 2250-2400 m
Slope: 30-70%
Aspect: 135-275°
Landscape position: upper slope

ECOLOGY

- harsh conditions limit plant growth and tree regeneration
- short growing season

SUCCESSION

- normal succession for this subzone, which is quite slow compared to lower areas
- tree establishment occurs only on sheltered sites or in years of mild climate

6	Alpine fir - western yarrow - alpine timothy

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing climatic climax
Stand appearance: krummholz

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Krummholz

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (3)	-		alpine fir	3
			alpine larch	3
Low shrub layer (20)	alpine fir	15	alpine larch	3
			shrubby cinquefoil	3
Herb layer (20)	western yarrow	5	sulphur hedysarum	3
	sedges	3	spike trisetum	5
	alpine timothy	5	arrow-leaved ragwort	3
			alpine blue grass	3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
arrow-leaved ragwort	Engelmann spruce white-flowered rhododendron smooth Pacific menziesia grouseberry fireweed lance-leaved stonecrop

TERRAIN AND SOILS

Terrain: deep or shallow soils of high mountain slopes; morainal veneer and blanket, colluvial
Soil Texture: sandy loam
Soil Association Comp: MC_8, MP_7, MP_{10}, RA_1
Moisture regime: mesic to submesic
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 2200-2350 m
Slope: 3-9%
Aspect: level or 180°
Landscape position: upper slope

ECOLOGY

- severe climatic conditions restrict plant growth and tree establishment
- short growing season

SUCCESSION

- normal succession for this subzone which is quite slow compared to lower areas
- tree establishment occurs only on sheltered sites or in years of mild climate

7	Willow - round-leaved alumroot - lance-leaved stonecrop

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: pioneer seral
Stand appearance: pioneer shrub

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (20)	willows	10	common juniper soopolallie shrubby cinquefoil	3 3 3
Herb layer (30)	wild strawberry western yarrow	7 5	round-leaved alumroot lance-leaved stonecrop rough fescue alpine timothy	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
soopolallie shrubby cinquefoil Pacific anemone	Engelmann spruce alpine larch smooth Pacific menziesia white-flowered rhododendron alpine blue grass

TERRAIN AND SOILS

Terrain: deep or shallow soils of high mountain slopes; colluvial blanket and fan, morainal veneer
Soil Texture: silt loam to sandy loam
Soil Association Comp: CM_1, CM_8, CY_8, MC_5
Moisture regime: submesic to subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1850-2200 m
Slope: 20-70%
Aspect: 120-225°
Landscape position: upper to middle slope

ECOLOGY

- tree regeneration inhibited by soil moisture deficits due to insolation and rapid soil drainage

SUCCESSION

-relatively slow rate of succession due to drought caused by rapid runoff and insulation

8	Alpine fir - subalpine fleabane - Sitka valerian

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook
Zone: Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine - whitebark pine, and Krummholz
Successional stage: maturing seral or edaphic climax
Stand appearance: open coniferous forest mixed with meadows

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (20)	alpine fir Engelmann spruce	10 7	whitebark pine	5
Tall shrub layer (10)	alpine fir	5	whitebark pine	5
Low shrub layer (15)	alpine fir	5	whitebark pine common juniper Engelmann spruce	3 3 3
Herb layer (25)	wild strawberry spike trisetum Sitka valerian fireweed	5 3 5 3	subalpine fleabane sedges alpine timothy	3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
alpine fir Engelmann spruce whitebark pine subalpine fleabane western meadow-rue green false hellebore	alpine larch shrubby cinquefoil white-flowered rhododendron smooth Pacific menziesia

TERRAIN AND SOILS

Terrain: deep soils of high mountain slopes and valleys; colluvial veneer and blanket, morainal, fluvial
Soil Texture: silt loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1900-2400 m
Slope: 3-45%
Aspect: various
Landscape position: middle slope, sometimes in hollows

ECOLOGY

- frequently moist and nutrient rich sites
- trees are inhibited from invading meadows due to rich herb growth and long snow duration

SUCCESSION

- relatively slow rate of succession due to long snow duration

116	Mountain vahlodea - alpine timothy - arrow-leaved ragwort

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

Successional stage: maturing edaphic climax
Stand appearance: meadow

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (2)	-		diamond willow	2
Herb layer (90)	mountain vahlodea alpine timothy	45 10	Kentucky blue grass arrow-leaved ragwort subalpine buttercup black alpine sedge	5 2 2 2
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
mountain vahlodea black alpine sedge	alpine fir Engelmann spruce smooth Pacific menziesia black blueberry grouseberry heart-leaved arnica	Canadian bunchberry

TERRAIN AND SOILS

Terrain: lacustrine plain in high mountain valley

Soil Texture: silty clay loam
Soil Association Comp: LL_1
Moisture regime: hygric
Drainage: very poor

TOPOGRAPHY

Elevation: 1800 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- high water table much of the year in collecting position
- possible flooding

SUCCESSION

- edaphic climax vegetation
- after disturbance fairly rapid establishment of similar cover is expected

9	Alpine fir - smooth Pacific menziesia - grouseberry - heart-leaved arnica

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

Successional stage: overmature seral to climatic climax
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	alpine fir Engelmann spruce	20 10	lodgepole pine	3
Tall shrub layer (15)	alpine fir	7	thin-leaved mountain alder Engelmann spruce	5 3
Low shrub layer (40)	smooth Pacific menziesia black swamp gooseberry	5 5	alpine fir white-flowered rhododendron	5 7
Herb layer (20)	grouseberry heart-leaved arnica	5 5	few-flowered one-sided wintergreen northern twinflower	3 3
Moss, lichen and liverwort layer (50)	common moss	30		

CHARACTER SPECIES

Present	Absent
twinberry honeysuckle northern twinflower	wild rye grass wild strawberry green false hellebore arrow-leaved ragwort

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial veneer, blanket and apron, morainal
Soil Texture: sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to submesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1650-2050 m
Slope: 30-80%
Aspect: 270-90°
Landscape position: middle slope to upper slope

ECOLOGY

- generally good moisture conditions on northern exposure
- well developed moss and litter layers provide relatively abundant nutrient supply

SUCCESSION

- normal rate of succession for this subzone
- typical mature vegetation for average moisture conditions
- Successional Sequence #41

10	Alpine fir - white-flowered rhododendron - grouseberry - western mountainbells

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: overmature seral to climatic climax
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	alpine fir Engelmann spruce	15 10	lodgepole pine	10
Tall shrub layer (15)	alpine fir	15	thin-leaved mountain alder Engelmann spruce	5 5
Low shrub layer (60)	smooth Pacific menziesia white-flowered rhododendron alpine fir Engelmann spruce	20 15 7 3	thin-leaved mountain alder black blueberry Utah honeysuckle	3 10 3
Herb layer (20)	grouseberry heart-leaved arnica	15 3	few-flowered one-sided wintergreen western mountainbells Sitka valerian bear-grass	3 3 3 20
Moss, lichen and liverwort layer (20)	-		common moss	15

CHARACTER SPECIES

Present	Absent
smooth Pacific menziesia	twinberry honeysuckle
white-flowered rhododendron	large-leaved rattlesnake orchid
grouseberry	western meadow-rue
bear-grass	fireweed
	arrow-leaved ragwort

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial and morainal blanket, fluvial
Soil Texture: silt loam to loamy sand
Soil Association Comp: CI_2, CM_1, GC_2, ME_5, MR_4
Moisture regime: submesic to subhygric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1650-2050 m
Slope: 30-55%
Aspect: various
Landscape position: middle slope to upper slope

ECOLOGY

- moisture deficits may occur due to coarse-textured soils and rapid drainage

SUCCESSION

- normal rate of succession for this subzone although it may be slower when this vegetation is associated with drier sites
- typical mature vegetation on average sites of this subzone
- Successional Sequence #41

Plate 2.3 Group B. 11) Alpine fir - Engelmann spruce - black swamp gooseberry - large-leaved rattlesnake orchid. The vegetation of this site is dominated by alpine fir, white-flowered rhododendron, smooth Pacific menziesia and heart-leaved arnica on a northwest-facing slope of colluvium at 1900 m.

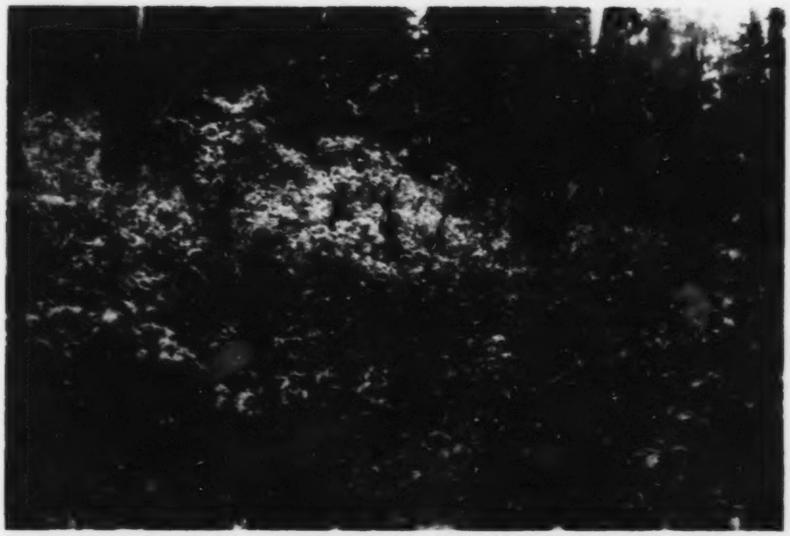


Plate 2.4 Group B. 12) Alpine fir - smooth Pacific menziesia - heart-leaved arnica - unifoliate-leaved foamflower. The vegetation of this site is dominated by Engelmann spruce, alpine fir, white-flowered rhododendron, and heart-leaved arnica on a northeast-facing slope of colluvium at 1800 m.

11	Alpine fir - Engelmann spruce - smooth Pacific menziesia - black swamp gooseberry - large-leaved rattlesnake orchid (see Plate 2.3)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

Successional stage: maturing climatic climax
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	alpine fir Engelmann spruce	25 25	lodgepole pine	10
Tall shrub layer (15)	alpine fir	15	Engelmann spruce	7
Low shrub layer (40)	alpine fir black swamp gooseberry smooth Pacific menziesia white-flowered rhododendron	20 3 15 7	black blueberry Utah honeysuckle	5 3
Herb layer (30)	grouseberry large-leaved rattlesnake orchid	20 3	heart-leaved arnica western meadow-rue Sitka valerian	7 3 3
Moss, lichen and liverwort layer (10)	-		common moss	15

CHARACTER SPECIES

Present	Absent
alpine fir Engelmann spruce large-leaved rattlesnake orchid Sitka valerian heart-leaved arnica bracted lousewort	thin-leaved mountain alder unifoliate-leaved foamflower sweet-scented bedstraw

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial blanket and apron, morainal
Soil Texture: silt loam to loam
Soil Association Comp: CM_1, CM_4, CO_2, CY_1, MG_1
Moisture regime: mesic
Drainage: well to moderately drained

TOPOGRAPHY

Elevation: 1850-2000 m
Slope: 35-65%
Aspect: various
Landscape position: middle slope

ECOLOGY

- relatively good moisture and nutrient supply

SUCCESSION

- typical climax vegetation for average sites of this subzone
- normal rate of succession is expected after disturbance
- Successional Sequence #42

12 Alpine fir - smooth Pacific menziesia - heart-leaved arnica - unifoliate-leaved foamflower (see Plate 2.4)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: overmature seral to climatic climax
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	alpine fir Engelmann spruce	35 30	lodgepole pine	10
Tall shrub layer (15)	alpine fir Engelmann spruce	10 5	-	
Low shrub layer (60)	smooth Pacific menziesia white-flowered rhododendron alpine fir	35 5 10	black blueberry Utah honeysuckle black swamp gooseberry Engelmann spruce	5 3 5 3
Herb layer (30)	heart-leaved arnica grouseberry few-flowered one-sided wintergreen	15 25 3	large-leaved rattlesnake orchid unifoliate-leaved foamflower Canadian bunchberry western meadow-rue	3 3 5 3
Moss, lichen and liverwort layer (50)	common moss	40	various	

CHARACTER SPECIES

Present	Absent
western thimbleberry	blue elder
Oregon boxwood	showy aster
unifoliate-leaved foamflower	wild rye grass
evergreen yellow violet	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial and morainal blanket, fluvial fan
Soil Texture: clay loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1550-2000 m
Slope: 20-45%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- relatively abundant moisture supply
- somewhat leached soils

SUCCESSION

- typical vegetation of mature stands of slightly wetter than average sites
- relatively fast rate of succession after disturbance because of favourable moisture status
- Successional Sequence #42

Plate 2.5 Group B. 13) Sitka mountain alder - blue elder - common cow-parsnip - western meadow-rue. The vegetation of this site is subjected to avalanching and excessive soil moisture. This site is dominated by common cow-parsnip and grasses, with Sitka mountain alder on the steeper slopes (in the upper left of photo). It is on an east-facing colluvial slope at 1450 m.

Plate 2.6 Group C. 15) Lodgepole pine - whitebark pine - birch-leaved spirea - Indian paintbrush. The vegetation of this site is dominated by lodgepole pine and grouseberry, on an east-facing slope of colluvium at 1800 m.

13	Sitka mountain alder - blue elder - common cow-parsnip - western meadow-rue (see Plate 2.5)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: edaphic climax
Stand appearance: pioneer shrub

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (20)	Sitka mountain alder	20	-	
Low shrub layer (50)	Sitka mountain alder blue elder	40 10	-	
Herb layer (50)	western meadow-rue green false hellebore common cow-parsnip	10 7 10	sweet-scented bedstraw Douglas' aster red baneberry	5 10 5
Moss, lichen and liverwort layer (5)	-		-	

CHARACTER SPECIES

Present	Absent	
Sitka mountain alder	alpine fir	heart-leaved arnica
blue elder	Engelmann spruce	
common cow-parsnip	lodgepole pine	
	smooth Pacific menziesia	
	white-flowered rhododendron	
	grouseberry	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial blanket and fan
Soil Texture: silt loam to sandy loam
Soil Association Comp: CI_8, CM_2, CM_8, CZ_8
Moisture regime: subhygric to hygric
Drainage: moderately well to well

TOPOGRAPHY

Elevation: 1450-1850 m
Slope: 15-60%
Aspect: various
Landscape position: middle slope to upper slope

ECOLOGY

- areas subject to snow avalanching
- high moisture availability due to seepage promotes lush herb and shrub growth which may prevent tree establishment
- cool air may flow down these areas from higher areas

SUCCESSION

- succession may be slow after disturbance because of avalanching and unstable slopes caused by excessive moisture and competition with dense herbs and shrubs

14	Alpine fir - smooth Pacific menziesia - grouseberry - arrow-leaved ragwort

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine - whitebark pine

Successional stage: overmature seral to climatic climax
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	Engelmann spruce alpine fir	20 15	-	
Tall shrub layer (15)	alpine fir Engelmann spruce	15 3	-	
Low shrub layer (30)	smooth Pacific menziesia alpine fir black swamp gooseberry Engelmann spruce	10 15 5 3	twinberry honeysuckle Utah honeysuckle black blueberry white-flowered rhododendron	3 3 5 10
Herb layer (50)	heart-leaved arnica grouseberry	5 30	western meadow-rue arrow-leaved ragwort wild rye grass green false hellebore	5 5 7 5
Moss, lichen and liverwort layer (50)	common moss	30	-	

CHARACTER SPECIES

Present	Absent
unifoliate-leaved foamflower Canadian bunchberry	willows birch-leaved spirea pine grass yellow penstemon

TERRAIN AND SOILS

Terrain: deep soils of mountain valleys; morainal and colluvial blanket, fluvial fan and terrace
Soil Texture: silt loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1550-2150 m
Slope: 0-50%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- variable type on wide range of habitats reflecting relatively moist and nutrient rich sites particularly when in lower slope positions

SUCCESSION

- mature vegetation of sites with slightly better moisture than average
- the rate of succession after disturbance is expected to be relatively fast
- Successional Sequence #43

15 Lodgepole pine - smooth Pacific menziesia - grouseberry - fireweed (see Plate 2.6)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook
Zone: Subalpine Engelmann spruce - alpine fir

Successional stage: young seral
Stand appearance: open coniferous forest
Subzone: Lodgepole pine - whitebark pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	lodgepole pine	35	-	
Tall shrub layer (20)	lodgepole pine	15	willow alpine fir Engelmann spruce	3 5 5
Low shrub layer (15)	willow alpine fir	5 5	whitebark pine Engelmann spruce birch-leaved spirea smooth Pacific menziesia	3 3 5 15
Herb layer (45)	grouseberry fireweed heart-leaved arnica	30 5 5	hawkweed western yarrow pine grass showy aster	3 3 5 3
Moss, lichen and liverwort layer (15)	-		sheet lichens	10

CHARACTER SPECIES

Present	Absent
lodgepole pine trembling aspen	common saskatoon common harebell green false hellebore

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes; colluvial blanket, veneer and fan, morainal, fluvial terrace
Soil Texture: sandy loam to silt loam
Soil Association Comp: CM$_2$, CW$_1$, GB$_3$, KG$_2$, MM$_1$
Moisture regime: mesic to submesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1400-2050 m
Slope: 20-80%
Aspect: various
Landscape position: middle slope

ECOLOGY

- generally steep slopes with rapid runoff and low moisture availability

SUCCESSION

- typical young seral vegetation of drier sites on adjacent areas of the two subzones in which it occurs
- succession is slower than normal
- Successional Sequence #42

16 Lodgepole pine - whitebark pine - birch-leaved spirea - Indian paintbrush

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young seral
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (20)	whitebark pine lodgepole pine	5 15	alpine fir	5
Tall shrub layer (15)	-		lodgepole pine alpine fir	10 5
Low shrub layer (20)	birch-leaved spirea	10	common juniper common saskatoon western thimbleberry Oregon boxwood	3 3 3 5
Herb layer (25)	grouseberry fireweed western yarrow Indian paintbrush	10 3 3 3	wild strawberry pine grass common harebell Douglas' aster	3 10 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
sedges common harebell	Engelmann spruce smooth Pacific menziesia white-flowered rhododendron few-flowered one-sided wintergreen

TERRAIN AND SOILS

Terrain: mountain slopes with deep or shallow soils; colluvial blanket, veneer and fan
Soil Texture: silt loam to sandy loam
Soil Association Comp: BO_6, CH_1, CI_2, CS_2, CY_8, RG_5
Moisture regime: mesic to subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1550-2000 m
Slope: 26-65%
Aspect: 140-225°
Landscape position: middle to upper slope

ECOLOGY

- generally on southern exposures which are droughty
- revegetation is slow

SUCCESSION

- slow rate of succession due to drought
- severe disturbance on southern exposures creates a persistent shrub-herb community
- Successional Sequence #43

Plate 2.7 Group C. 17) Willow - soopolallie - yellow penstemon - thistles. The vegetation of this site is dominated by lodgepole pine, soopolallie, grouseberry and birch-leaved spirea on a west-facing slope of shallow colluvium at 2000 m. This site has been severely burned.

17	Willow - soopolallie - yellow penstemon - thistle (see Plate 2.7)

VEGETATION CHARACTERISTICS

Region: Dry Interior

Section: Radium, Cranbrook

Successional stage: pioneer seral

Stand appearance: pioneer shrub

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (5)	-		Engelmann spruce	5
Low shrub layer (15)	willow soopolallie Engelmann spruce	3 3 3	birch-leaved spirea lodgepole pine alpine fir Oregon boxwood	3 3 3 3
Herb layer (20)	wild strawberry yellow penstemon common pearly everlasting	7 3 3	Indian paintbrush grouseberry spike trisetum showy aster	3 5 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
trembling aspen thistles northwestern sedge	alpine fir heart-leaved arnica

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes; morainal blanket, colluvial veneer, fluvial level

Soil Texture: silt loam to sandy loam

Soil Association Comp: FU_1, FZ_1, ML_4, RN_2, RN_7, SP_1

Moisture regime: mesic to subxeric

Drainage: well to rapid

TOPOGRAPHY

Elevation: 1450-2050 m

Slope: 25-50%

Aspect: 135-250°

Landscape position: middle to lower slope

ECOLOGY

- generally southern exposure creates moisture deficits
- revegetation is slow

SUCCESSION

- very slow rate of succession due to drought and severe disturbance
- this shrub-herb community will be persistent

18	Lodgepole pine - blue elder - wild rye grass - fireweed

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

Successional stage: young seral
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (40)	lodgepole pine	40	-	
Tall shrub layer (5)	lodgepole pine	5	alpine fir	3
Low shrub layer (20)	black swamp gooseberry blue elder Utah honeysuckle subalpine fleabane	10 3 3 3	twinberry honeysuckle lodgepole pine	3 3
Herb layer (60)	fireweed wild rye grass wild strawberry subalpine fleabane	10 20 15 5	western yarrow heart-leaved arnica western meadow-rue arrow-leaved ragwort	3 15 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
blue elder arrow-leaved ragwort green false hellebore subalpine fleabane	willows smooth Pacific menziesia pine grass showy aster

TERRAIN AND SOILS

Terrain: deep soils of mountain valley; fluvial, morainal, colluvial fan
Soil Texture: silt loam to loam
Soil Association Comp: CY_8, FK_{11}, MG_2, MN_1
Moisture regime: mesic to hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1600 m approx.
Slope: 5-25%
Aspect: various
Landscape position: lower slope receiving positions

ECOLOGY

- generally moisture and nutrient receiving sites of lower slope positions with good growth and revegetation following disturbance

SUCCESSION

- relatively fast rate of succession because of favourable moisture supply
- typical young seral stage for moist valley bottom areas of this subzone
- Successional Sequence #45

19	Lodgepole pine - soopolallie - grouseberry - pine grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (25)	lodgepole pine	20	alpine fir Engelmann spruce	5 5
Tall shrub layer (25)	lodgepole pine	20	alpine fir Engelmann spruce	5 3
Low shrub layer (15)	soopolallie alpine fir	5 5	common juniper birch-leaved spirea twinberry honeysuckle Engelmann spruce	3 3 3 3
Herb layer (50)	grouseberry fireweed heart-leaved arnica	30 5 5	wild strawberry western yarrow pine grass sulphur hedysarum	3 3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
soopolallie	arrow-leaved ragwort

TERRAIN AND SOILS

Terrain: deep or shallow soil of mountain slopes; colluvial veneer and blanket, morainal veneer and blanket, fluvial terrace
Soil Texture: silt loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: mesic to subxeric
Drainage: well

TOPOGRAPHY

Elevation: 1450-2200 m
Slope: 10-60%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- generally sites with low moisture availability
- at higher elevations generally confined to southern exposures because of warmer conditions

SUCCESSION

- generally, normal rate of succession although droughty soils may create a slower rate
- fairly typical young seral vegetation in adjacent areas of these two subzones
- Successional Sequence #41

20 Alpine fir - twinberry honeysuckle - northern twinflower

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Successional stage: young to overmature seral
Stand appearance: open coniferous forest

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	Engelmann spruce alpine fir	20 25	lodgepole pine	5
Tall shrub layer (20)	alpine fir Engelmann spruce	15 15	-	
Low shrub layer (20)	alpine fir	15	twinberry honeysuckle white-flowered rhododendron Engelmann spruce	3 5 3
Herb layer (20)	northern twinflower few-flowered one-sided wintergreen grouseberry	5 3 3	heart-leaved arnica pine grass yellow glacier lily	3 5 3
Moss, lichen and liverwort layer (40)	common moss feather moss	20 10	small cushion moss	5

CHARACTER SPECIES

Present	Absent
large-leaved rattlesnake orchid northwestern sedge	soopolallie Indian paintbrush western yarrow

TERRAIN AND SOILS

Terrain: mountain slope with deep colluvium or moraine

Soil Texture: silt loam to sandy loam
Soil Association Comp: BS$_6$, CB$_7$, MC$_1$, SP$_3$
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1200-1800 m
Slope: 10-40%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- generally good moisture and nutrient availability

SUCCESSION

- normal rate of succession for adjacent areas within these two subzones

21	Engelmann spruce - soopolallie - grouseberry - northern twinflower

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to overmature seral
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (25)	Engelmann spruce	15	lodgepole pine alpine fir	10 5
Tall shrub layer (10)	-		lodgepole pine Engelmann spruce alpine fir	10 7 5
Low shrub layer (30)	soopolallie birch-leaved spirea smooth Pacific menziesia	10 10 10	common juniper Engelmann spruce alpine fir	3 5 3
Herb layer (35)	grouseberry northern twinflower Canadian bunchberry	20 5 5	pine grass wild strawberry showy aster fireweed	3 3 10 3
Moss, lichen and liverwort layer (30)	common moss	20	-	

CHARACTER SPECIES

Present	Absent
Rocky Mountain Douglas-fir soopolallie birch-leaved spirea	few-flowered one-sided wintergreen green pyrola

TERRAIN AND SOILS

Terrain: slopes or benches of mountain valleys; morainal blanket, fluvial fan and terrace
Soil Texture: silt loam to sandy loam
Soil Association Comp: GB$_3$, KG$_1$, MC$_1$, ML$_2$, MM$_2$, SP$_1$
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1250-1900 m
Slope: 0-50%
Aspect: 130-235°
Landscape position: lower slope to middle slope

ECOLOGY

- good to moderate moisture availability
- southern aspects generally associated with gentle slopes and/or higher elevations

SUCCESSION

- normal rate of succession although it may be slower on droughty soils
- Successional Sequence #43

22	Lodgepole pine - smooth Pacific menziesia - common western pipsissewa - western yarrow

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	60	Rocky Mountain Douglas-fir	10
Tall shrub layer (10)	alpine fir Engelmann spruce	5 5	thin-leaved mountain alder willow lodgepole pine	5 3 3
Low shrub layer (10)	smooth Pacific menziesia	10	common juniper black swamp gooseberry Utah honeysuckle Engelmann spruce	3 3 3 3
Herb layer (70)	grouseberry fireweed few-flowered one-sided evergreen heart-leaved arnica	50 5 5 5	pine grass western yarrow Canadian bunchberry northwestern sedge	5 3 5 3
Moss, lichen and liverwort layer (30)	various species	30		

CHARACTER SPECIES

Present	Absent
common western pipsissewa spike-like goldenrod	white-flowered rhododendron twinberry honeysuckle

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; morainal blanket, fluvial
Soil Texture: silt loam to sandy loam
Soil Association Comp: KA_4, MU_5
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1750-1850 m
Slope: 25-60%
Aspect: various
Landscape position: middle to lower slopes

ECOLOGY

- good moisture availability when in lower slope receiving positions

SUCCESSION

- normal rate of succession
- typical young seral vegetation for steeper sloped areas
- Successional Sequence #42

23	Engelmann spruce - smooth Pacific menziesia - thin-leaved mountain alder - large-leaved rattlesnake orchid

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: overmature seral
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (25)	alpine fir Engelmann spruce lodgepole pine	10 10 5	-	
Tall shrub layer (25)	thin-leaved mountain alder alpine fir	15 10	Engelmann spruce	5
Low shrub layer (30)	smooth Pacific menziesia thin-leaved mountain alder Utah honeysuckle	20 7 5	birch-leaved spirea twinberry honeysuckle white-flowered rhododendron black blueberry	3 3 3 5
Herb layer (15)	large-leaved rattlesnake orchid few-flowered one-sided wintergreen heart-leaved arnica	3 3 3	pine grass Canadian bunchberry western meadow-rue yellow glacier lily	3 3 3 3
Moss, lichen and liverwort layer (30)	common moss	20	feather moss small cushion moss	15 5

CHARACTER SPECIES

Present	Absent
alpine fir thin-leaved mountain alder large-leaved rattlesnake orchid	Rocky Mountain Douglas-fir dwarf scouring-rush fireweed wild strawberry

TERRAIN AND SOILS

Terrain: mountain slopes with deep colluvium or moraine

Soil Texture: sandy loam
Soil Association Comp: CM_1, ME_2
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1550-1850 m
Slope: 15-35%
Aspect: 270-360°
Landscape position: middle slope

ECOLOGY

- relatively good moisture and nutrient availability
- well developed litter layer with good nutrient cycling

SUCCESSION

- relatively fast rate of succession due to favourable moisture supply
- typical overmature seral vegetation for moist areas within this subzone
- Successional Sequence #43

24 Engelmann spruce - smooth Pacific menziesia - western mountainbells - common moss

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing climatic climax
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	Engelmann spruce	30	-	
Tall shrub layer (20)	alpine fir Engelmann spruce	10 10	-	
Low shrub layer (20)	alpine fir twinberry honeysuckle smooth Pacific menziesia Engelmann spruce	15 3 3 3	black swamp gooseberry Utah honeysuckle	5 3
Herb layer (15)	grouseberry few-flowered one-sided evergreen western mountainbells	5 3 5	northern twinflower Canadian bunchberry dwarf scouring-rush	3 3 3
Moss, lichen and liverwort layer (40)	common moss	30	feather moss small cushion moss	15 5

CHARACTER SPECIES

Present	Absent
western mountainbells dwarf scouring-rush common mitrewort Rocky Mountain ragwort northwestern sedge	lodgepole pine birch-leaved spirea thin-leaved mountain alder showy aster pine grass

TERRAIN AND SOILS

Terrain: deep soils of mountain valleys; morainal, fluvial level
Soil Texture: silt loam
Soil Association Comp: GZ_2, MG_3
Moisture regime: mesic to subhygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 1650-1700 m
Slope: 5-7%
Aspect: 290-310°
Landscape position: lower slope

ECOLOGY

- good moisture and nutrient availability for these lower slope position sites
- moisture may be held up by clay enriched soil horizon

SUCCESSION

- relatively fast rate of succession due to favourable moisture supply
- fairly typical climax vegetation for sites that are slightly wetter than average
- Successional Sequence #42

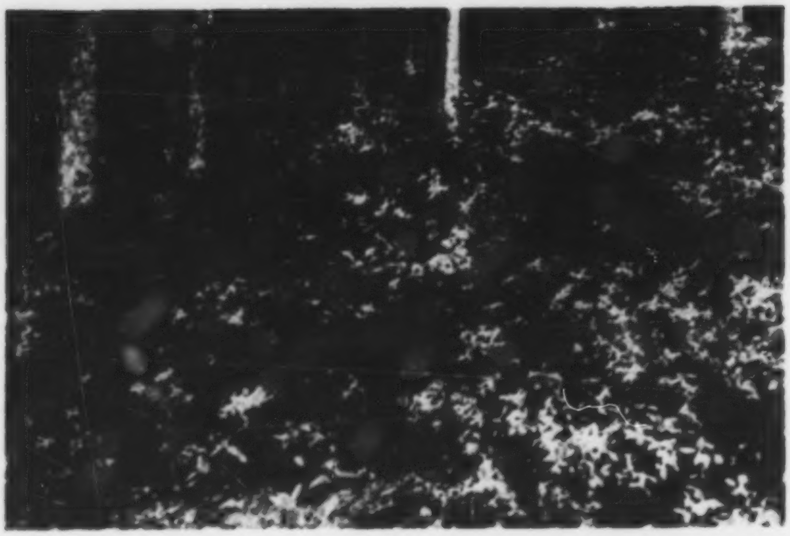


Plate 2.8 Group D. 25) Engelmann spruce - smooth Pacific menziesia - high bush cranberry - grouseberry - common moss. The vegetation of this site is dominated by Engelmann spruce, smooth Pacific menziesia, grouseberry, asters and common moss on an east-facing slope of moraine at 1400 m (see plate 2.9).

Plate 2.9 Group D. 25) Engelmann spruce - smooth Pacific menziesia - high bush cranberry - grouseberry - common moss. The understory of this site is dominated by grouseberry, showy aster, and common moss (see plate 2.8).

25	Engelmann spruce - smooth Pacific menziesia - high bush cranberry - grouseberry - common moss (see Plates 2.8 and 2.9)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral to climatic climax
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (25)	Engelmann spruce	20	lodgepole pine alpine fir	10 5
Tall shrub layer (30)	alpine fir Engelmann spruce	20 7	thin-leaved mountain alder	5
Low shrub layer (30)	smooth Pacific menziesia Utah honeysuckle black swamp gooseberry twinberry honeysuckle	20 5 3 3	soopolallie birch-leaved spirea Engelmann spruce alpine fir	3 3 3 5
Herb layer (25)	grouseberry heart-leaved arnica Canadian bunchberry northern twinflower	15 7 3 3	wild strawberry fireweed western meadow-rue false Solomon's-seal	3 3 3 3
Moss, lichen and liverwort layer (45)	common moss feather moss	30 15	small cushion moss layered moss	5 5

CHARACTER SPECIES

Present	Absent
lodgepole pine western thimbleberry soopolallie high bush cranberry wild strawberry false Solomon's-seal	few-flowered one-sided wintergreen northwestern sedge

TERRAIN AND SOILS

Terrain: deep soils of mountain valleys; morainal or fluvial

Soil Texture: clay loam to loamy sand
Soil Association Comp: CW_3, KG_2, MC_2, ME_1
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1400-1700 m
Slope: 10-40%
Aspect: 90-240°
Landscape position: middle to lower slope

ECOLOGY

- moderately good moisture availability
- well developed litter layer is important in nutrient cycling

SUCCESSION

- normal rate of succession
- typical mature vegetation for this subzone
- Successional Sequence #42

26 Lodgepole pine - smooth Pacific menziesia - birch-leaved spirea - pine grass - moss

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing to overmature seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine	50	alpine fir	20
			Engelmann spruce	15
Tall shrub layer (15)	alpine fir	10	-	
	Engelmann spruce	5		
Low shrub layer (35)	smooth Pacific menziesia	20	soopolallie	3
	alpine fir	10	black swamp gooseberry	3
	birch-leaved spirea	5	Utah honeysuckle	3
	Engelmann spruce	5	twinberry honeysuckle	3
Herb layer (25)	grouseberry	15	pine grass	5
	showy aster	3	northwestern sedge	5
	Canadian bunchberry	3	stiff club-moss	3
	heart-leaved arnica	3	western meadow-rue	3
Moss, lichen and liverwort layer (50)	common moss	20	hairy-cap moss	5
	feather moss	10	fruticose lichens	5
	layered moss	10		

CHARACTER SPECIES

Present	Absent
black blueberry soopolallie	-

TERRAIN AND SOILS

Terrain: slopes and terraces of mountain valleys; morainal or colluvial blanket, fluvial terrace
Soil Texture: silt loam to sandy loam
Soil Association Comp: CH_2, FO_4, MC_1, MO_1
Moisture regime: mesic to subhygric
Drainage: well drained to moderately well drained

TOPOGRAPHY

Elevation: 1450-2000 m
Slope: 0-35%
Aspect: various
Landscape position: lower to middle slope

ECOLOGY

- generally lower slope receiving sites enriched in moisture and nutrients

SUCCESSION

- normal rate of succession
- typical mature vegetation for adjacent areas of these two subzones
- Successional Sequence #43

27 Engelmann spruce - thin-leaved mountain alder - heart-leaved arnica

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	Engelmann spruce Rocky Mountain Douglas-fir	30 25	alpine fir lodgepole pine	5 5
Tall shrub layer (20)	thin-leaved mountain alder	20	-	
Low shrub layer (15)	smooth Pacific menziesia thin-leaved mountain alder black swamp gooseberry Utah honeysuckle	5 3 3 3	birch-leaved spirea rose twinberry honeysuckle blue elder	3 3 3 3
Herb layer (20)	grouseberry heart-leaved arnica showy aster northern twinflower	10 5 3 3	few-flowered one-sided wintergreen common western pipsissewa Canadian bunchberry	3 3 3
Moss, lichen and liverwort layer (5)	-		common moss	20

CHARACTER SPECIES

Present	Absent
Rocky Mountain Douglas-fir western larch thin-leaved mountain alder western blue clematis	soopolallie fireweed western meadow-rue pine grass

TERRAIN AND SOILS

Terrain: colluvial blanket of mountain slopes

Soil Texture: silt loam to sandy loam
Soil Association Comp: CB_1, CX_1
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1600-1750 m
Slope: 40-70%
Aspect: 290-75°
Landscape position: middle slope

ECOLOGY

- steep sloped northern exposure with relatively good moisture availability
- moisture deficits in summer
- rapid surface runoff in early spring

SUCCESSION

- normal rate of succession
- typical maturing seral vegetation for moister than average conditions for this subzone

28 Rocky Mountain Douglas-fir - Rocky Mountain maple - smooth Pacific menziesia - heart-leaved arnica - moss

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (80)	alpine fir Engelmann spruce Rocky Mountain Douglas-fir	45 20 20	lodgepole pine	5
Tall shrub layer (15)	alpine fir Engelmann spruce	10 5	-	
Low shrub layer (20)	smooth Pacific menziesia birch-leaved spirea black swamp gooseberry Rocky Mountain maple	10 3 3 3	Utah honeysuckle Engelmann spruce alpine fir soopolallie	3 3 5 3
Herb layer (30)	heart-leaved arnica Canadian bunchberry few-flowered one-sided wintergreen dwarf scouring-rush	15 3 3 3	grouseberry green pyrola northern twinflower	5 3 3
Moss, lichen and liverwort layer (40)	common moss feather moss	20 15	small cushion moss	5

CHARACTER SPECIES

Present	Absent
Rocky Mountain maple dwarf scouring-rush	thin-leaved mountain alder common western pipsissewa

TERRAIN AND SOILS

Terrain: colluvial blanket of mountain slopes

Soil Texture: loam to sandy loam
Soil Association Comp: CW_1, CW_3
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1450-1600 m
Slope: 45-65%
Aspect: 10-80°
Landscape position: middle slope

ECOLOGY

- steep unexposed sites with good moisture availability and good regeneration
- rapid surface runoff in early spring

SUCCESSION

- normal rate of succession
- typical mature vegetation of average sites for this subzone
- Successional Sequence #28

29 Lodgepole pine - Utah honeysuckle - high bush cranberry - Canadian bunchberry

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (70)	lodgepole pine Engelmann spruce	60 10	Rocky Mountain Douglas-fir	5
Tall shrub layer (10)	Engelmann spruce	5	alpine fir thin-leaved mountain alder	5 5
Low shrub layer (30)	smooth Pacific menziesia Utah honeysuckle birch-leaved spirea alpine fir	15 10 10 5	black swamp gooseberry twinberry honeysuckle soopolallie western thimbleberry high bush cranberry	3 3 3 5 5
Herb layer (35)	grouseberry showy aster heart-leaved arnica Canadian bunchberry	15 5 5 10	common western pipsissewa northwestern sedge large-leaved rattlesnake orchid green pyrola	3 3 3 3
Moss, lichen and liverwort layer (50)	common moss layered moss	30 20	small cushion moss sheet lichens	5 5

CHARACTER SPECIES

Present	Absent
thin-leaved mountain alder high bush cranberry northwestern sedge large-leaved rattlesnake orchid common western pipsissewa	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial or morainal blanket, fluvial level
Soil Texture: silt loam to sandy loam
Soil Association Comp: CB_1, CT_2, CT_7, CW_1, ME_1, ME_4
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1250-1650 m
Slope: 20-40%
Aspect: 290-45°
Landscape position: middle to lower slope

ECOLOGY

- generally on steep unexposed slopes with relatively good moisture availability

SUCCESSION

- relatively fast rate of succession due to favourable moisture supply
- typical mature vegetation for sites that are wetter than average
- Successional Sequence #43

30	Engelmann spruce - white-flowered rhododendron - Canadian bunchberry - moss

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral to climatic climax
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	Engelmann spruce alpine fir	25 35	lodgepole pine	20
Tall shrub layer (15)	alpine fir Engelmann spruce	7 5	thin-leaved mountain alder	10
Low shrub layer (15)	alpine fir	10	white-flowered rhododendron soopolallie smooth Pacific menziesia	10 3 5
Herb layer (25)	grouseberry Canadian bunchberry northern twinflower	15 5 3	few-flowered one-sided wintergreen heart-leaved arnica dwarf scouring-rush	3 3 3
Moss, lichen and liverwort layer (50)	common moss layered moss feather moss	20 10 10	various species	10

CHARACTER SPECIES

Present	Absent
white-flowered rhododendron	black swamp gooseberry
common western pipsissewa	western meadow-rue
large-leaved rattlesnake orchid	fireweed
	showy aster

TERRAIN AND SOILS

Terrain: deep soils of mountain valleys and terraces; colluvial blanket, morainal, fluvial fan and terrace
Soil Texture: sandy loam to silt loam
Soil Association Comp: CM_2, CW_1, GB_3, KG_2, MM_1
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1400-1700 m
Slope: 7-50%
Aspect: various
Landscape position: lower to middle slope

ECOLOGY

- generally on non-exposed slopes with good moisture availability and good to moderate nutrient availability

SUCCESSION

- relatively fast rate of succession due to favourable moisture supply
- typical mature vegetation for wetter than average sites
- Successional Sequence #34, 44

31	Lodgepole pine - twinberry honeysuckle - heart-leaved arnica - western mountainbells

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to overmature seral
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (45)	lodgepole pine Engelmann spruce	25 10	alpine fir	20
Tall shrub layer (15)	alpine fir	10	Engelmann spruce	5
Low shrub layer (15)	alpine fir twinberry honeysuckle black swamp gooseberry	7 3 3	common juniper soopolallie rose willow	3 5 3 3
Herb layer (20)	grouseberry heart-leaved arnica western mountainbells	10 5 3	pine grass Canadian bunchberry few-flowered one-sided wintergreen northern twinflower	3 3 3 3
Moss, lichen and liverwort layer (35)	common moss feather moss	20 10	small cushion moss	5

CHARACTER SPECIES

Present	Absent
willows	smooth Pacific menziesia
black swamp gooseberry	birch-leaved spirea
western mountainbells	common western pipsissewa
pine grass	large-leaved rattlesnake orchid
fireweed	
yellow wood violet	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial blanket and veneer, morainal veneer, fluvial
Soil Texture: silt loam to sandy loam
Soil Association Comp: CM$_1$, CS$_2$, GC$_2$, GL$_1$
Moisture regime: mesic to submesic
Drainage: well

TOPOGRAPHY

Elevation: 1500-1700 m
Slope: 5-60%
Aspect: various
Landscape position: middle slope

ECOLOGY

- sites on southern exposures generally are on gentle slopes
- relatively good moisture availability
- moisture deficits during summer

SUCCESSION

- normal rate of succession
- Successional Sequence #42

Plate 2.10 Group E. 32) Lodgepole pine - smooth Pacific menziesia - grouseberry - moss. The vegetation of this site is dominated by lodgepole pine, smooth Pacific menziesia, grouseberry and common moss. It is on a fluvial terrace at 1200 m (see Plate 2.12).

32	Lodgepole pine - smooth Pacific menziesia - grouseberry - moss (see Plate 2.10)

VEGETATION CHARACTERISTICS

Region: Dry Interior

Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

Successional stage: maturing to overmature seral

Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	lodgepole pine Engelmann spruce	20 15	alpine fir	5
Tall shrub layer (5)	alpine fir Engelmann spruce	5 3	-	
Low shrub layer (20)	smooth Pacific menziesia soopolallie alpine fir Engelmann spruce	10 5 5 3	Utah honeysuckle lodgepole pine	3 3
Herb layer (25)	grouseberry showy aster Canadian bunchberry	15 5 3	rough fescue heart-leaved arnica northern twinflower western meadow-rue	5 5 3 5
Moss, lichen and liverwort layer (30)	common moss feather moss	20 15	-	

CHARACTER SPECIES

Present	Absent
smooth Pacific menziesia rough fescue	baldhip rose black swamp gooseberry pine grass

TERRAIN AND SOILS

Terrain: fluvial terrace

Soil Texture: sandy loam

Soil Association Comp: KG_2

Moisture regime: mesic to submesic

Drainage: well to rapid

TOPOGRAPHY

Elevation: 1550-1650 m

Slope: 3-15%

Aspect: 45-100°

Landscape position: lower slope

ECOLOGY

- moisture deficiency limit plant growth
- low to moderate nutrient availability
- litter layer is valuable for nutrient supply in these coarse materials

SUCCESSION

- normal rate of succession
- typical mature vegetation for average sites of this subzone
- Successional Sequence #42

Plate 2.11 Group E. 33) Engelmann spruce - baldhip rose - Canadian bunchberry - common horsetail. The vegetation of this site is dominated by hybrid spruce, common horsetail, Canadian bunchberry and layered moss on a floodplain at 1200 m (see Plate 2.12).

Plate 2.12 Group E. 33) Engelmann spruce - baldhip rose - Canadian bunchberry - common horsetail. (see Plate 2.11).

33 Engelmann spruce - baldhip rose - Canadian bunchberry - common horsetail (see Plates 2.11 and 2.12)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing edaphic climax
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	Engelmann spruce	30	black cottonwood	5
Tall shrub layer (10)	Engelmann spruce	10	willows	3
Low shrub layer (20)	twinberry honeysuckle Engelmann spruce	5 5	black swamp gooseberry willows common juniper baldhip rose	3 10 3 3
Herb layer (20)	common horsetail wild strawberry Canadian bunchberry northern twinflower	10 5 5 3	showy aster few-flowered one-sided wintergreen wild rye grass dwarf scouring-rush	5 3 3 3
Moss, lichen and liverwort layer (30)	common moss layered moss	20 10		

CHARACTER SPECIES

Present	Absent
common juniper	lodgepole pine
black swamp gooseberry	alpine fir
baldhip rose	birch-leaved spirea
common horsetail	smooth Pacific menziesia
wild rye grass	grouseberry
rough fescue	fireweed
	western mountainbells

TERRAIN AND SOILS

Terrain: floodplains

Soil Texture: sandy loam
Soil Association Comp: FU_1, FU_3
Moisture regime: hygric
Drainage: moderately well to poor

TOPOGRAPHY

Elevation: 1250-1450 m
Slope: 0-5%
Aspect: various
Landscape position: valley floor floodplains

ECOLOGY

- wet sites with poor drainage
- possible flooding on these sites
- good tree growth where water table is not continuously high

SUCCESSION

- relatively fast rate of succession except where high water tables inhibit regeneration of Engelmann spruce
- typical climax vegetation for wet valley bottom areas
- Successional Sequence #48

34	Engelmann spruce - soopolallie - twinberry honeysuckle - northern twinflower - western meadow-rue

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to overmature seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	alpine fir Engelmann spruce	20 35	lodgepole pine	15
Tall shrub layer (10)	alpine fir Engelmann spruce	5 5	willow	5
Low shrub layer (35)	soopolallie smooth Pacific menziesia alpine fir	10 10 7	twinberry honeysuckle Utah honeysuckle Engelmann spruce rose	5 3 3 3
Herb layer (15)	heart-leaved arnica northern twinflower western meadow-rue grouseberry	3 5 5 3	showy aster Canadian bunchberry pine grass wild rye grass	3 5 10 3
Moss, lichen and liverwort layer (40)	common moss layered moss feather moss	20 10 10	-	

CHARACTER SPECIES

Present	Absent
smooth Pacific menziesia black swamp gooseberry pine grass wild rye grass Douglas' aster western mountainbells	-

TERRAIN AND SOILS

Terrain: lower slopes and terraces with deep soils; colluvial or morainal blanket, fluvial terrace, lacustrine
Soil Texture: silty clay loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: mesic to subhygric
Drainage: well to imperfect

TOPOGRAPHY

Elevation: 1600-1700 m
Slope: 3-30%
Aspect: various
Landscape position: middle to lower slopes

ECOLOGY

- varies from sites with average moisture availability to wet sites with slow drainage on floodplains
- lush plant growth reflects high nutrient availability

SUCCESSION

- normal rate of succession
- typical seral vegetation of lower slope areas of these two subzones

Plate 2.13 Group F. 35) Lodgepole pine - birch-leaved spirea - grouseberry - heart-leaved arnica - fireweed. The vegetation of this site is dominated by lodgepole pine, soopolallie, birch-leaved spirea, heart-leaved arnica and common moss on a level fluvial terrace at 1450 m.

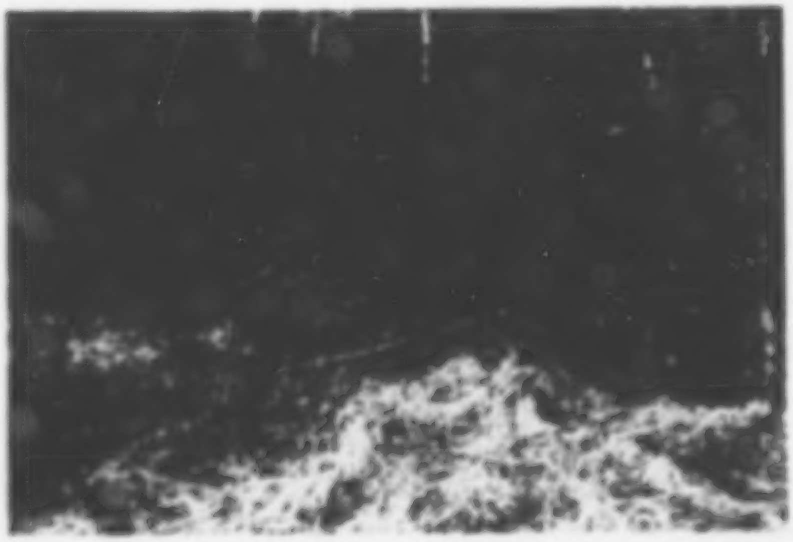


Plate 2.14 Group G. 42) Lodgepole pine - Rocky Mountain maple - soopolallie - pine grass. The vegetation of this site is dominated by Rocky Mountain Douglas-fir, common snowberry, pine grass and heart-leaved arnica. It is found on a southeast-facing colluvial slope at 1100 m.

35	Lodgepole pine - birch-leaved spirea - grouseberry - heart-leaved arnica - fireweed (see Plate 2.13)

VEGETATION CHARACTERISTICS

Region: Dry Interior

Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine, and Rocky Mountain Douglas-fir - lodgepole pine

Successional stage: young seral

Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	60	-	
Tall shrub layer (30)	lodgepole pine willows alpine fir Engelmann spruce	25 3 5 3	western larch thin-leaved mountain alder	3 5
Low shrub layer (25)	birch-leaved spirea Utah honeysuckle alpine fir Engelmann spruce	10 3 5 3	soopolallie willow smooth Pacific menziesia Oregon boxwood	10 3 3 7
Herb layer (50)	grouseberry heart-leaved arnica	30 10	pine grass Canadian bunchberry common western pipsissewa fireweed	5 5 3 3
Moss, lichen and liverwort layer (10)	-		common moss	15

CHARACTER SPECIES

Present	Absent
soopolallie willows fireweed heart-leaved arnica	western hemlock western red cedar Rocky Mountain maple blue-bead clintonia false Solomon's-seal

TERRAIN AND SOILS

Terrain: mountain slopes and terraces; deep or shallow soil; morainal, colluvial blanket and veneer, fluvial, lacustrine

Soil Texture: silty clay loam to sandy loam

Soil Association Comp: wide range of soils

Moisture regime: submesic to mesic

Drainage: well

TOPOGRAPHY

Elevation: 1200-1800 m

Slope: 0-60%

Aspect: various

Landscape position: various

ECOLOGY

- young seral vegetation of variable site conditions
- moisture deficits during summer months particularly where the soil heats up due to direct exposure to the sun

SUCCESSION

- normal rate of succession except on droughty, coarse-textured soils where regeneration of trees is inhibited
- Successional Sequence #43

36	Engelmann spruce - western hemlock - Oregon boxwood - bear-grass

VEGETATION CHARACTERISTICS

Region: Interior Wet Belt/Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Interior western hemlock - western red cedar and,
Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine - Engelmann spruce - alpine fir
Lodgepole pine - whitebark pine and Rocky
Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	Engelmann spruce alpine fir	35 20	western larch western red cedar lodgepole pine	20 20 10
Tall shrub layer (15)	-		western hemlock alpine fir western red cedar	10 10 5
Low shrub layer (40)	Utah honeysuckle Oregon boxwood alpine fir	10 10 15	black blueberry western red cedar western hemlock birch-leaved spirea	10 5 5 3
Herb layer (35)	bear-grass large-leaved rattlesnake orchid few-flowered one-sided wintergreen	20 10 5	grouseberry blue-bead clintonia common pink pyrola unifoliate-leaved foamflower	10 10 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
western red cedar western hemlock common saskatoon common pink pyrola bear-grass	willows soopolallie fireweed Canadian bunchberry

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes or terraces; colluvial blanket and veneer, morainal
Soil Texture: silt loam to loamy sand
Soil Association Comp: CJ_1, CW_3, GT_1
Moisture regime: mesic to hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 100-1650 m
Slope: 0-45%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moist sites often due to high precipitation
- various habitats
- lush plant growth

SUCCESSION

- normal rate of succession in Interior western hemlock - western red cedar zone while relatively fast rate of succession for the Subalpine Engelmann spruce - alpine fir zone
- typical mature vegetation for average sites of the former zone

37	Alpine fir - western red cedar - Rocky Mountain maple - black blueberry - oak fern

VEGETATION CHARACTERISTICS

Region: Interior Wet Belt, Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral to climatic climax
Stand appearance: open coniferous forest

Zone: Interior western hemlock - western red cedar, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine - Engelmann spruce - alpine fir, Lodgepole pine - whitebark pine and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	alpine fir Engelmann spruce	15 15	western red cedar	20
Tall shrub layer (20)	Rocky Mountain maple alpine fir	10 7	thin-leaved mountain alder western red cedar Engelmann spruce	3 3 3
Low shrub layer (20)	black blueberry smooth Pacific menziesia alpine fir	7 7 5	western thimbleberry western red cedar Oregon boxwood birch-leaved spirea	3 3 3 3
Herb layer (10)	oak fern heart-leaved arnica	5 3	large-leaved rattlesnake orchid blue-bead clintonia spiny shield fern northern twinflower	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
western red cedar oak fern spiny shield fern	common saskatoon creeping Oregon-grape common western pipsissewa northwestern sedge bear-grass

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; colluvial or morainal blanket, fluvial terrace
Soil Texture: sandy loam to silty clay loam
Soil Association Comp: CJ_1, CM_2, CS_2, MR_4, RH_3
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1000-1550 m
Slope: 0-35%
Aspect: various
Landscape position: middle to lower slopes

ECOLOGY

- generally in areas of higher precipitation
- good moisture availability
- moderately deep snow, and relatively cool for this position in the landscape

SUCCESSION

- normal rate of succession for Interior western hemlock - western red cedar zone while relatively fast rate of succession for the Subalpine Engelmann spruce - alpine fir zone
- typical mature vegetation for the former zone
- Successional Sequence #51

38 Lodgepole pine - western red cedar - birch-leaved spirea - blue-bead clintonia

VEGETATION CHARACTERISTICS

Region: Interior Wet Belt, Dry Interior
Section: Dry Interior

Successional stage: maturing seral
Stand appearance: open to dense coniferous forest

Zone: Interior western hemlock - western red cedar, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine - Engelmann spruce - alpine fir, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine Engelmann spruce	35 10	western larch alpine fir	10 10
Tall shrub layer (20)	thin-leaved mountain alder Engelmann spruce alpine fir	10 5 5	lodgepole pine Rocky Mountain Douglas-fir western red cedar	3 3 3
Low shrub layer (25)	birch-leaved spirea smooth Pacific menziesia black blueberry western thimbleberry	10 5 5 3	alpine fir Utah honeysuckle Engelmann spruce western hemlock	5 3 3 5
Herb layer (15)	blue-bead clintonia grouseberry northern twinflower large-leaved rattlesnake orchid	5 5 3 3	common western pipsissewa Canadian bunchberry pine grass	3 3 5
Moss, lichen and liverwort layer (10)			common moss	20

CHARACTER SPECIES

Present	Absent	
	twinberry honeysuckle fireweed wild strawberry mountain sweetcicely sweet-scented bedstraw spiny shield fern	oak fern

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; morainal or colluvial blanket, fluvial terrace, lacustrine
Soil Texture: silt loam to sandy loam
Soil Association Comp: AS_1, CL_2, FR_3, LN_6, MU_1, SF_3
Moisture regime: mesic to hygric
Drainage: well to moderately well (rarely poor)

TOPOGRAPHY

Elevation: 1150-1550 m
Slope: 3-45%
Aspect: 280-120°
Landscape position: lower to middle slope

ECOLOGY

- generally non-exposed sites in areas of high precipitation
- frequently moisture receiving sites

SUCCESSION

- normal rate of succession
- typical maturing seral vegetation for adjacent areas of these two zones

39	Lodgepole pine - alpine fir - western thimbleberry - showy aster

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense to open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine alpine fir Engelmann spruce	35 10 10	-	
Tall shrub layer (10)	alpine fir	5	willows thin-leaved mountain alder Engelmann spruce	5 5 3
Low shrub layer (45)	smooth Pacific menziesia black blueberry Utah honeysuckle alpine fir	30 7 3 5	western thimbleberry Engelmann spruce birch-leaved spirea Sitka mountain-ash	10 5 5 3
Herb layer (30)	heart-leaved arnica western meadow-rue Canadian bunchberry showy aster	10 10 5 3	grouseberry blue-bead clintonia large-leaved rattlesnake orchid fireweed	10 5 3 3
Moss, lichen and liverwort layer (10)	-		common moss	80

CHARACTER SPECIES

Present	Absent
twinberry honeysuckle pine grass mountain sweetcicely sweet-scented bedstraw	-

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes and terraces; colluvial veneer and blanket, moraine, fluvial
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1250-1950 m
Slope: 0-40%
Aspect: various
Landscape position: lower slope to middle slope

ECOLOGY

- relatively good moisture and nutrient availability
- frequently in receiving position

SUCCESSION

- normal rate of succession
- typical young seral vegetation on lower slopes

40	Lodgepole pine - Rocky Mountain Douglas-fir - common saskatoon - pine grass - wild strawberry

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, Western larch - ponderosa pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (70)	lodgepole pine western larch Rocky Mountain Douglas-fir	40 20 30	-	
Tall shrub layer (5)	-		Rocky Mountain Douglas-fir	5
Low shrub layer (15)	birch-leaved spirea soopolallie common saskatoon rose	5 5 3 3	creeping Oregon-grape thin-leaved mountain alder willows	3 3 3
Herb layer (50)	pine grass fireweed wild strawberry Canadian bunchberry	35 5 3 3	showy aster northern twinflower wood strawberry blue-bead clintonia	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	-

CHARACTER SPECIES

Present	Absent	
sulphur hedysarum common harebell	western red cedar western hemlock common snowberry black swamp gooseberry smooth Pacific menziesia western thimbleberry	Oregon boxwood heart-leaved arnica few-flowered one-sided wintergreen

TERRAIN AND SOILS

Terrain: fluvial terraces

Soil Texture: sandy loam
Soil Association Comp: FX_1, GB_1, KE_1
Moisture regime: mesic to subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1150-1450 m
Slope: 7-30%
Aspect: various
Landscape position: lower to middle slope

ECOLOGY

- generally rapidly drained areas with low moisture availability

SUCCESSION

- relatively slow rate of succession due to droughty soils
- typical young seral vegetation of fluvial terraces

- Successional Sequence #33

41 Lodgepole pine - birch-leaved spirea - pine grass - dwarf blueberry

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	50	western larch Rocky Mountain Douglas-fir	10 10
Tall shrub layer (7)	western larch	5	lodgepole pine Rocky Mountain Douglas-fir	3 5
Low shrub layer (20)	birch-leaved spirea soopolallie	10 5	creeping Oregon-grape Rocky Mountain Douglas-fir willow common juniper	5 3 3 3
Herb layer (40)	pine grass grouseberry	30 5	dwarf blueberry kinnikinnick heart-leaved arnica northern twinflower	7 3 3 5
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
three-spot mariposa lily	alpine fir	western meadow-rue
dwarf blueberry	Rocky Mountain maple	
lupines	common saskatoon	
	baldhip rose	
	sulphur hedysarum	
	violets	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; colluvial, morainal, fluvial, lacustrine
Soil Texture: silt loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: submesic to mesic
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 950-1600 m
Slope: 5-65%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- variable sites - moderate moisture availability
- moisture deficits during summer months

SUCCESSION

- normal rate of succession except on droughty coarse-textured soils where regeneration of trees is inhibited
- typical young seral vegetation for lower slopes and terraces
- Successional Sequences #13, 30, 38

42	Lodgepole pine - Rocky Mountain maple - soopolallie - pine grass (see Plate 2.14)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to mature seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine Rocky Mountain Douglas-fir	35 20	common paper birch western larch trembling aspen	5 5 5
Tall shrub layer (20)	Rocky Mountain maple Rocky Mountain Douglas-fir	10 7	common saskatoon willows	3 3
Low shrub layer (30)	birch-leaved spirea soopolallie common snowberry creeping Oregon-grape	7 10 5 5	western thimbleberry Rocky Mountain Douglas-fir common juniper rose	3 3 3 3
Herb layer (40)	pine grass heart-leaved arnica showy aster northern twinflower	30 3 3 3	wild strawberry common western pipsissewa large-leaved rattlesnake orchid	3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
common paper birch Douglas' aster wild sarsaparilla	Engelmann spruce alpine fir

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; morainal, colluvial, fluvial terrace, lacustrine
Soil Texture: silty clay loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: submesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 850-1500 m
Slope: 0-50%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- variable site conditions
- generally moderate moisture availability

SUCCESSION

- normal rate of succession except where droughty, coarse-textured soils inhibit tree regeneration
- typical seral vegetation of lower slopes and terraces
- Successional Sequence #20

43 Trembling aspen - soopolallie - pine grass - fireweed

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young seral
Stand appearance: open mixed forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine subzone

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (35)	lodgepole pine trembling aspen willows	10 15 10	Englmann spruce Rocy Mountain Douglas-fir	5 5
Low shrub layer (20)	soopolallie birch-leaved spirea	10 5	Rocy Mountain Douglas-fir comon saskatoon Oreon boxwood Englmann spruce	3 5 3 3
Herb layer (30)	pine grass western meadow-rue fireweed	10 5 5	shoy aster norhern twinflower fewflowered one-sided wintergreen woo strawberry	10 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
Engelmann spruce western blue clematis	lodgepole ine Rocky Mouain Douglas-fir alpine fir black bluerry

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; morainal, colluvial apron and fan, fluvial, lacustrine
Soil Texture: silt loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPGRAPHY

Eletion: 1000-1650 m
Slo: 4-40%
Aspt: various
Lancape position: middle to lower slopes

ECOLOGY

- variable vegetation
- generally good moisture availability

SUESSION

- nomal rate of succession
- trmbling aspen is present possibly due to severe fi; slower succession to a coniferous dominated cor than normal due to a higher base status of thsoils
- Suessional Sequence #15

Plate 2.15 Group G. 44) Lodgepole pine - western red cedar - Oregon boxwood - northern twinflower. The vegetation of this site is dominated by lodgepole pine, western thimbleberry, Oregon boxwood, Canadian bunchberry and mosses. It is on an east-facing colluvial slope at 800 m.

Plate 2.16 Group G. 115) Rocky Mountain Douglas-fir - layered moss. The vegetation of this site is dominated by Rocky Mountain Douglas-fir with a continuous cover of layered moss. It is on a northeast-facing morainal slope at 900 m.

44	Lodgepole pine - western red cedar - Oregon boxwood - northern twinflower (see Plate 2.15)

VEGETATION CHARACTERISTICS

Region: Interior Wet Belt/Dry Interior
Section: Radium, Cranbrook

Successional stage: young to overmature seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir, and all montane zones
Subzone: various

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine	35	western larch Rocky Mountain Douglas-fir	10 20
Tall shrub layer (15)	Rocky Mountain Douglas-fir alpine fir	5 5	thin-leaved mountain alder Rocky Mountain maple common saskatoon	5 5 3
Low shrub layer (40)	birch-leaved spirea Oregon boxwood western thimbleberry	15 5 10	soopolallie creeping Oregon-grape western red cedar Rocky Mountain Douglas-fir	5 3 3 3
Herb layer (40)	northern twinflower pine grass	10 10	showy aster common western pipsissewa Canadian bunchberry blue-bead clintonia	3 3 5 3
Moss, lichen and liverwort layer (5)	-		-	

CHARACTER SPECIES

Present	Absent
lodgepole pine western red cedar black blueberry western red-osier dogwood green pyrola spreading dogbane	western blue clematis

TERRAIN AND SOILS

Terrain: deep and shallow soils of mountain slopes and terraces; morainal, colluvial; fluvial
Soil Texture: silty clay loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: submesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 800-1650 m
Slope: 0-65%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- wide range of site conditions with corresponding variability in vegetation
- generally good moisture availability

SUCCESSION

- generally a normal rate of succession although this varies by Forest Zone
- Successional Sequence #50

115	Rocky Mountain Douglas-fir - layered moss (see Plate 2.16)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young climatic climax
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (75)	Rocky Mountain Douglas-fir	75	lodgepole pine	5
Tall shrub layer (2)	-		Rocky Mountain juniper	2
Low shrub layer (10)	-		Wood's rose birch-leaved spirea common snowberry Rocky Mountain Douglas-fir	5 2 2 5
Herb layer (15)	-		showy aster green pyrola pine grass	10 2 5
Moss, lichen and liverwort layer (95)	layered moss	95	-	

CHARACTER SPECIES

Present	Absent	
lodgepole pine common snowberry showy aster green pyrola	western larch creeping Oregon-grape nodding onion western yarrow kinnikinnick wild strawberry	heart-leaved arnica

TERRAIN AND SOILS

Terrain: morainal blanket in valley bottom

Soil Texture: silt loam
Soil Association Comp: MO_1
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 900 m
Slope: 40%
Aspect: 42°
Landscape position: lower slope

ECOLOGY

- relatively good moisture availability due to protected aspect
- calcareous soil results in shallow rooting

SUCCESSION

- normal rate of succession

Plate 2.17 Group H. 45) Rocky Mountain Douglas-fir - common juniper - wild strawberry - sulphur hedysarum. The vegetation of this site is dominated by Rocky Mountain Douglas-fir, Engelmann spruce, birch-leaved spirea, pine grass and showy aster. It is on an east-facing colluvial slope at 1450 m.

Plate 2.18 Group H. 47) Lodgepole pine - common snowberry - high bush cranberry - pine grass - northwestern sedge. The vegetation of this site is dominated by lodgepole pine, high bush cranberry, rose, showy aster, pine grass and layered moss. It is on morainal material on a moderate, southwest-facing slope at 1300 m.

45 Rocky Mountain Douglas-fir - common juniper - wild strawberry - sulphur hedysarum (see Plate 2.17)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	Rocky Mountain Douglas-fir Engelmann spruce	20 10	alpine fir	5
Tall shrub layer (10)	Engelmann spruce	5	lodgepole pine alpine fir	5 3
Low shrub layer (15)	alpine fir common juniper soopolallie Engelmann spruce	3 3 3 3	Rocky Mountain Douglas-fir birch-leaved spirea rose black swamp gooseberry	3 5 3 3
Herb layer (30)	pine grass wild strawberry	10 10	sulphur hedysarum showy aster Canadian bunchberry northern twinflower	3 5 3 3
Moss, lichen and liverwort layer (20)	common moss	20	-	

CHARACTER SPECIES

Present	Absent	
black swamp gooseberry	western larch	large-leaved rattlesnake orchid
western yarrow	trembling aspen	
sulphur hedysarum	creeping Oregon-grape	
sedges	common snowberry	
dwarf scouring-rush	thin-leaved mountain alder	
	common western pipsissewa	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; colluvial, morainal, fluvial fan
Soil Texture: loam to sandy loam
Soil Association Comp: CI_1, CW_7, GB_1, MC_1, RN_4, SP_3
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1300-1850 m
Slope: 20-50%
Aspect: various
Landscape position: lower to middle slope

ECOLOGY

- moderate moisture availability
- moisture deficits in summer
- vegetation is valuable in stabilizing soils

SUCCESSION

- relatively slow rate of succession due to droughty soils
- Successional Sequence #33

46	Lodgepole pine - trembling aspen - birch-leaved spirea - pine grass - grouseberry

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine and Rocky Mountain Douglas-fir - lodgepole pine and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine western larch	40 25	trembling aspen	7
Tall shrub layer (15)	Rocky Mountain Douglas-fir thin-leaved mountain alder	5 7	western larch willow Engelmann spruce	3 3 3
Low shrub layer (25)	birch-leaved spirea Engelmann spruce soopolallie common saskatoon	7 3 5 3	Rocky Mountain Douglas-fir creeping Oregon-grape Utah honeysuckle alpine fir	3 3 3 3
Herb layer (30)	pine grass grouseberry northern twinflower	15 10 5	kinnikinnick common western pipsissewa large-leaved rattlesnake orchid Canadian bunchberry	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
trembling aspen	twinberry honeysuckle
western larch	black swamp gooseberry
willow	common snowberry
thin-leaved mountain alder	northwestern sedge
western yarrow	few-flowered one-sided wintergreen
lupine	western meadow-rue

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; colluvial, morainal, fluvial, lacustrine
Soil Texture: silty clay loam to loamy sand
Soil Association Comp: CLD_1, GL_2, KA_2, LY_1, MS_4
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1050-1450 m
Slope: 3-30%
Aspect: various
Landscape position: middle slope to lower slope

ECOLOGY

- variable habitats
- moderate moisture availability
- moisture deficits in summer

SUCCESSION

- normal rate of succession except where droughty soils inhibit tree regeneration
- typical seral vegetation on mountain slopes
- Successional Sequence #33

47 Lodgepole pine - common snowberry - high bush cranberry - pine grass - northwestern sedge (see Plate 2.18)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral to climatic climax
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	45	Rocky Mountain Douglas-fir Engelmann spruce alpine fir	10 7 10
Tall shrub layer (15)	alpine fir Engelmann spruce	10 3	Rocky Mountain Douglas-fir Rocky Mountain maple	3 3
Low shrub layer (10)	Utah honeysuckle alpine fir	3 3	Rocky Mountain Douglas-fir common snowberry common saskatoon twinberry honeysuckle	3 3 3 3
Herb layer (20)	pine grass northern twinflower few-flowered one-sided wintergreen Canadian bunchberry	5 3 3 3	showy aster heart-leaved arnica common western pipsissewa northwestern sedge	5 3 3 3
Moss, lichen and liverwort layer (40)	common moss feather moss layered moss	20 10 10	small cushion moss	5

CHARACTER SPECIES

Present		Absent
alpine fir Rocky Mountain Douglas-fir twinberry honeysuckle high bush cranberry northwestern sedge rough-fruited fairybells	western meadow-rue green pyrola fairyslipper	thin-leaved mountain alder lupines

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; morainal, fluvial, colluvial
Soil Texture: silt loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: mesic to submesic
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1050-1550 m
Slope: 0-45%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moderate moisture availability
- moisture deficits in summer
- good nutrient status

SUCCESSION

- normal rate of succession except where droughty, coarse-textured soils inhibit tree regeneration

48	Lodgepole pine - thin-leaved mountain alder - soopolallie - pine grass - sulphur hedysarum

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	60	Rocky Mountain Douglas-fir	5
Tall shrub layer (10)	alpine fir	5	thin-leaved mountain alder	3
	Engelmann spruce	5		
Low shrub layer (25)	soopolallie	10	common saskatoon	3
	birch-leaved spirea	3	rose	3
	thin-leaved mountain alder	5	willow	3
	alpine fir	5	Engelmann spruce	3
Herb layer (50)	pine grass	40	common western pipsissewa	3
	heart-leaved arnica	5	fireweed	3
	showy aster	5	sulphur hedysarum	3
			western meadow-rue	3
Moss, lichen and liverwort layer (15)	common moss	15		

CHARACTER SPECIES

Present	Absent
common saskatoon	western larch
thin-leaved mountain alder	twinberry honeysuckle
sulphur hedysarum	northwestern sedge
racemose pussytoes	rough-fruited fairybells
western mountainbells	
lupines	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; morainal, colluvial, fluvial terrace
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: CB_4, CW_1, GB_1, MT_1, SP_1
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1350-1600 m
Slope: 0-35%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moisture deficits in summer may restrict tree growth

SUCCESSION

- relatively slow rate of succession due to droughty soils
- Successional Sequence #33

49 Lodgepole pine - soopolallie - showy aster - Indian paintbrush

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine, and Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (10)	-		lodgepole pine	40
Tall shrub layer (50)	lodgepole pine willow	50 5	thin-leaved mountain alder Engelmann spruce	3 3
Low shrub layer (40)	soopolallie birch-leaved spirea western thimbleberry	20 10 10	black swamp gooseberry Utah honeysuckle willows Engelmann spruce	3 3 3 3
Herb layer (20)	northern twinflower Canadian bunchberry grouseberry evergreen yellow violet	5 5 3 3	showy aster pine grass wild strawberry western meadow-rue	20 5 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
western thimbleberry	common saskatoon
Indian paintbrush	western meadow-rue
Canadian bunchberry	twinberry honeysuckle
northern twinflower	black blueberry
evergreen yellow violet	common western pipsissewa
	large-leaved rattlesnake orchid

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes; colluvial fan and veneer, morainal blanket
Soil Texture: silt loam to sandy loam
Soil Association Comp: CB_3, MG_2, RN_2
Moisture regime: mesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1450-1650 m
Slope: 30-65%
Aspect: 240-270°
Landscape position: middle to lower slope

ECOLOGY

- moderate moisture availability
- moisture deficiency during summer months on these western exposures

SUCCESSION

- relatively slow rate of succession due to droughty soils caused by rapid runoff and coarse-textured soils

50 Lodgepole pine - birch-leaved spirea - black blueberry - fireweed

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (60)	lodgepole pine	50	Rocky Mountain Douglas-fir Engelmann spruce alpine fir	5 5 5
Low shrub layer (30)	birch-leaved spirea twinberry honeysuckle black blueberry western thimbleberry	20 3 3 3	Engelmann spruce alpine fir Rocky Mountain Douglas-fir common saskatoon	3 3 3 3
Herb layer (15)	fireweed common western pipsissewa few-flowered one-sided wintergreen green pyrola	5 3 3 3	wild strawberry heart-leaved arnica large-leaved rattlesnake orchid northwestern sedge	5 10 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
black blueberry green pyrola	soopolallie black swamp gooseberry pine grass showy aster Canadian bunchberry northern twinflower western meadow-rue grouseberry

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; fluvial terrace, morainal
Soil Texture: sandy loam
Soil Association Comp: GB_4, MU_1
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1350-1450 m
Slope: 3-55%
Aspect: various (non-exposed)
Landscape position: middle slope to valley floor

ECOLOGY

- moderate moisture availability
- moisture deficits in summer months limits productivity and revegetation

SUCCESSION

- normal rate of succession except where droughty soils inhibits tree regeneration
- Successional Sequence #33

51	Lodgepole pine - western thimbleberry - pine grass - cream-coloured peavine

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	60	-	
Tall shrub layer (15)	willow western larch	5 3	Engelmann spruce lodgepole pine Rocky Mountain maple common saskatoon	10 5 5 3
Low shrub layer (25)	western thimbleberry alpine fir birch-leaved spirea common saskatoon	7 3 5 3	Engelmann spruce soopolallie rose black blueberry	3 10 3 5
Herb layer (50)	pine grass northern twinflower showy aster western meadow-rue	30 10 3 5	few-flowered one-sided wintergreen cream-coloured peavine heart-leaved arnica common western pipsissewa	3 3 3 3
Moss, lichen and liverwort layer (5)	-		brachythecium moss	5

CHARACTER SPECIES

Present		Absent
alpine fir high bush cranberry soopolallie twinberry honeysuckle willow cream-coloured peavine	blue-bead clintonia northern twinflower	thin-leaved mountain alder showy aster pine grass

TERRAIN AND SOILS

Terrain: deep and shallow soils of level areas; fluvial terraces, morainal blanket, colluvial veneer
Soil Texture: silt loam to sandy loam
Soil Association Comp: BB_1, GD_1, MT_1
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1200-1500 m
Slope: usually level
Aspect: level
Landscape position: usually valley floor

ECOLOGY

- relatively good moisture availability
- lush herb growth and good tree growth reflecting good nutrient status and moderate acidity

SUCCESSION

- normal rate of succession
- Successional Sequence #33

52	Lodgepole pine - thin-leaved mountain alder - soopolallie - northern twinflower

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelman spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	60	-	
Tall shrub layer (5)	thin-leaved mountain alder	5	Engelmann spruce	3
Low shrub layer (20)	soopolallie Utah honeysuckle willow birch-leaved spirea	5 3 3 5	rose black swamp gooseberry twinberry honeysuckle Engelmann spruce	3 3 3 3
Herb layer (25)	northern twinflower heart-leaved arnica showy aster pine grass	5 5 5 5	Canadian bunchberry western meadow-rue fireweed grouseberry	5 3 3 5
Moss, lichen and liverwort layer (35)	common moss feather moss	20 15	-	

CHARACTER SPECIES

Present	Absent
twinberry honeysuckle thin-leaved mountain alder violets	Rocky Mountain Douglas-fir creeping Oregon-grape black blueberry northwestern sedge blue-bead clintonia

TERRAIN AND SOILS

Terrain: deep moraine of mountain slope and valley floor

Soil Texture: silty clay loam to loamy sand
Soil Association Comp: MU_3, SP_1
Moisture regime: mesic
Drainage: well drained

TOPOGRAPHY

Elevation: 1450-1550 m
Slope: 0-50%
Aspect: 190-270°
Landscape position: middle to lower slope

ECOLOGY

- relatively good moisture availability
- moisture deficits and surface runoff in summer months

SUCCESSION

- normal rate of succession
- Successional Sequence #33

53 Lodgepole pine - thin-leaved mountain alder - birch-leaved spirea - pine grass - northwestern sedge

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (70)	lodgepole pine	50	Rocky Mountain Douglas-fir western larch	20 30
Tall shrub layer (15)	thin-leaved mountain alder	10	Rocky Mountain Douglas-fir Engelmann spruce alpine fir common saskatoon	5 5 3 3
Low shrub layer (40)	birch-leaved spirea common saskatoon creeping Oregon-grape rose	20 7 5 5	Utah honeysuckle thin-leaved mountain alder western thimbleberry alpine fir	10 5 5 3
Herb layer (70)	pine grass northwestern sedge northern twinflower heart-leaved arnica	40 5 15 10	few-flowered one-sided wintergreen hawkweed showy aster common western pipsissewa	5 5 10 5
Moss, lichen and liverwort layer (15)	-		common moss feather moss	20 10

CHARACTER SPECIES

Present		Absent
western larch alpine fir creeping Oregon-grape Rocky Mountain Douglas-fir thin-leaved mountain alder kinnikinnick	northwestern sedge	twinberry honeysuckle

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; colluvial, lacustrine, fluvial terrace
Soil Texture: silt loam to sandy loam
Soil Association Comp: GN_1, LN_1, MO_4, SP_3
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1050-1600 m
Slope: 3-40%
Aspect: 270-100°
Landscape position: middle to lower slope

ECOLOGY

- moderate moisture availability
- moisture deficits in summer months restrict tree growth

SUCCESSION

- relatively slow rate of succession as droughty soils inhibit tree regeneration
- typical mature vegetation of lower slope and terraces
- Successional Sequence #33

121	Western thimbleberry - western meadow-rue - fireweed

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Successional stage: young seral
Stand appearance: recently logged

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (50)	western thimbleberry	25	thin-leaved mountain alder blue elder Oregon boxwood sweet-scented bedstraw	3 3 3 3
Herb layer (45)	western meadow-rue fireweed showy aster	20 10 10	sedge false Solomon's-seal red baneberry sweet-scented bedstraw	5 3 3 3
Moss, lichen and liverwort layer (5)	-		-	

CHARACTER SPECIES

Present	Absent
western thimbleberry American red blackberry fireweed American stinging nettle	trees smooth Pacific menziesia soopolallie pine grass heart-leaved arnica grouseberry

TERRAIN AND SOILS

Terrain: colluvial blanket on mountain slope

Soil Texture: silt loam
Soil Association Comp: CW_1
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1600 m
Slope: 25%
Aspect: 220°
Landscape position: middle slope

ECOLOGY

- sun exposed slope
- regeneration appears to be slow establishing because of competition with shrubs and herbs
- nutrient rich sites

SUCCESSION

- normal rate of succession once trees are established although shrub competition inhibits initial establishment of trees
- typical young vegetation immediately after disturbance
- Succession Sequence #37

54	Lodgepole pine - white spruce - soopolallie - pine grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook
Zone: Interior Rocky Mountain Douglas-fir
Subzone: Lodgepole pine

Successional stage: young to overmature seral
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine white spruce	60 55	-	
Tall shrub layer (45)	white spruce	45	-	
Low shrub layer (30)	soopolallie birch-leaved spirea rose white spruce	20 5 3 5	Rocky Mountain Douglas-fir common juniper willow western thimbleberry	3 10 3 3
Herb layer (20)	pine grass	20	showy aster Canadian bunchberry northern twinflower	3 3 3
Moss, lichen and liverwort layer (20)	common moss	20	-	

CHARACTER SPECIES

Present	Absent	
white spruce wild sarsaparilla timber milk-vetch sulphur hedysarum	Engelmann spruce alpine fir creeping Oregon-grape common saskatoon Utah honeysuckle kinnikinnick	common western pipsissewa fireweed few-flowered one-sided wintergreen

TERRAIN AND SOILS

Terrain: deep soils of mountain valleys; colluvial blanket, fluvial
Soil Texture: silt loam to sandy loam
Soil Association Comp: CW_1, MA_2
Moisture regime: hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1100-1200 m
Slope: 25-30%
Aspect: 210-250°
Landscape position: lower slope

ECOLOGY

- good moisture availability most of the year from seepage
- nutrient enriched sites

SUCCESSION

- relatively fast rate of succession due to favourable moisture supply
- leading to edaphic climax of white spruce
- typical vegetation of white spruce areas in Kootenay River valley in Kootenay National Park

Plate 2.19 Group I. 55) Lodgepole pine - soopalallie - rose - pine grass - Indian paintbrush. The vegetation of this type is dominated by lodgepole pine, showy aster, northern twinflower, wild rye grass and pine grass. It is on a southwest-facing morainal slope at 1550 m.

Plate 2.20 Group I. 57) Lodgepole pine - soopolallie - pine grass - dwarf blueberry. The vegetation of this site is dominated by lodgepole pine, soopolallie, pine grass and northern twinflower. It is found on a gentle slope of fluvial material at 1250 m.

55 Lodgepole pine - soopolallie - rose - pine grass - Indian paintbrush (see Plate 2.19)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Wadium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	lodgepole pine	35	trembling aspen Engelmann spruce	5 5
Tall shrub layer (20)	lodgepole pine	20	trembling aspen Engelmann spruce Rocky Mountain Douglas-fir	3 5 3
Low shrub layer (15)	rose soopolallie willow	5 10 3	birch-leaved spirea common saskatoon alpine fir Engelmann spruce	5 3 3 3
Herb layer (50)	pine grass showy aster kinnikinnick northern twinflower	35	wild strawberry Douglas' aster dwarf blueberry wild rye grass	5 3 5 3
Moss, lichen and liverwort layer (10)	-		common moss brachythecium moss	15 5

CHARACTER SPECIES

Present		Absent
trembling aspen	fireweed	white spruce
Engelmann spruce	wild rye grass	creeping Oregon-grape
alpine fir	Douglas' aster	common western pipsissewa
common saskatoon		green pyrola
Indian paintbrush		
cream-coloured peavine		

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes or terraces; colluvial and morainal veneer, morainal blanket, fluvial
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: BB_6, GD_1, LN_4, MA_2, ML_5, MN_4, MW_2
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1150-1750 m
Slope: 3-75%
Aspect: 200-260°
Landscape position: middle to lower slope

ECOLOGY

- generally found on sun exposed areas with moisture deficits throughout much of the growing season

SUCCESSION

- relatively slow rate of succession due to droughty soils which inhibit tree regeneration
- Successional Sequence #30

56	Lodgepole pine - white spruce - creeping Oregon-grape - pine grass - northern twinflower

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young or overmature seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine - Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	60	white spruce	20
Tall shrub layer (40)	lodgepole pine white spruce	30 7	alpine fir Rocky Mountain Douglas-fir	5 5
Low shrub layer (15)	creeping Oregon-grape Utah honeysuckle soopolallie	3 3 3	Rocky Mountain Douglas-fir birch-leaved spirea willows white spruce	3 5 3 3
Herb layer (25)	northern twinflower pine grass	7 15	kinnikinnick wild strawberry heart-leaved arnica common western pipsissewa	3 3 3
Moss, lichen and liverwort layer (30)	common moss	30	-	

CHARACTER SPECIES

Present	Absent
alpine fir white spruce baldhip rose common western pipsissewa large-leaved rattlesnake orchid	Engelmann spruce Indian paintbrush northwestern sedge western yarrow

TERRAIN AND SOILS

Terrain: morainal, colluvial veneer, fluvial terrace

Soil Texture: silt loam to sandy loam
Soil Association Comp: BS_6, FU_3, GD_1, GN_1, KG_2, MO_1, MM_1
Moisture regime: various
Drainage: various

TOPOGRAPHY

Elevation: 900-1800 m
Slope: 3-50%
Aspect: 180-300°
Landscape position: middle to lower slope

ECOLOGY

- variable vegetation on various habitats
- generally has good moisture availability
- organic matter important in nutrient cycling

SUCCESSION

- normal rate of succession
- usually leads to an edaphic climax of white spruce
- Successional Sequence #30

57	Lodgepole pine - soopolallie - pine grass - dwarf blueberry (see Plate 2.20)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	55	Engelmann spruce	5
Tall shrub layer (10)	Engelmann spruce	5	willow western larch lodgepole pine Rocky Mountain Douglas-fir	3 5 5 5
Low shrub layer (20)	soopolallie birch-leaved spirea rose Engelmann spruce	5 5 3 3	Rocky Mountain Douglas-fir common juniper common saskatoon smooth Pacific menziesia	5 3 3 3
Herb layer (50)	pine grass dwarf blueberry grouseberry northern twinflower	25 15 10 10	wild strawberry showy aster Canadian bunchberry fireweed	5 3 3 3
Moss, lichen and liverwort layer (15)	-		feather moss common moss	15 10

CHARACTER SPECIES

Present	Absent
Engelmann spruce twinberry honeysuckle Utah honeysuckle smooth Pacific menziesia grouseberry northwestern sedge	alpine fir western yarrow

TERRAIN AND SOILS

Terrain: deep soil of lower mountain slopes; morainal blanket, colluvial blanket, fluvial fan and terrace, lacustrine
Soil Texture: silty clay loam to silt loam, loamy sand
Soil Association Comp: wide range of soils
Moisture regime: various
Drainage: various

TOPOGRAPHY

Elevation: 1100-1550 m
Slope: 0-20%
Aspect: various
Landscape position: valley floor

ECOLOGY

- generally moderate moisture availability on coarse textured soils; rapid drainage may result in long periods of moisture deficit; on finer textured soils better moisture conditions usually prevail

SUCCESSION

- normal rate of succession except on droughty, coarse-textured soils which may inhibit tree regeneration
- typical seral vegetation of valley bottom sites in the Rocky Mountains
- Successional Sequence #13, 30, 38

Plate 2.21 Group I. 58) Lodgepole pine - soopolallie - pine grass - star-flowered false Solomon's-seal. The vegetation of this site is dominated by lodgepole pine, creeping Oregon-grape, pine grass and Canadian bunchberry (see plate 2.22). It is on a west-facing lacustrine slope at 900 m.

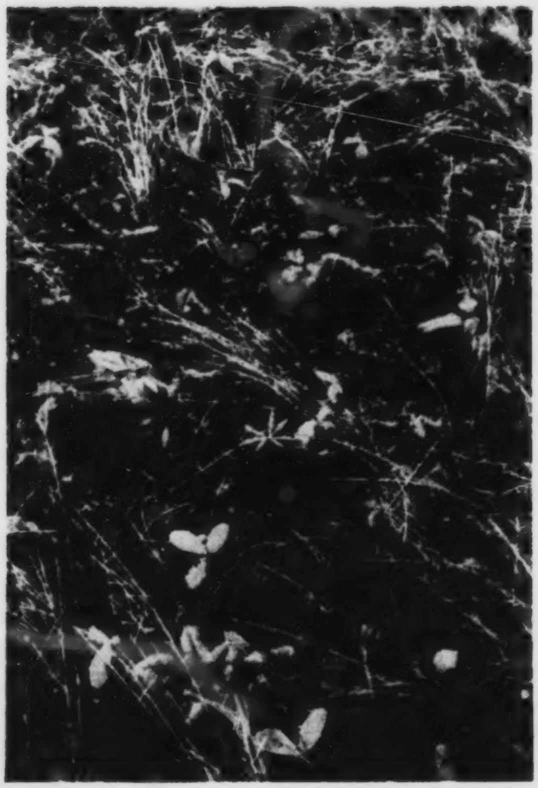


Plate 2.22 Group I. 58) Lodgepole pine - soopolallie - pine grass - star-flowered false Solomon's-seal. This is the ground vegetation of the site for Plate 2.21. It includes creeping Oregon-grape, pine grass and wild strawberry.

58 Lodgepole pine - soopolallie - pine grass - star-flowered false Solomon's-seal (see Plates 2.21 and 2.22)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young seral
Stand appearance: dense coniferous or mixed forest

Zone: Interior Rocky Mountain Douglas-fir/Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine/Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	50	trembling aspen	30
Tall shrub layer (10)	lodgepole pine trembling aspen	5 5	Engelmann spruce Rocky Mountain Douglas-fir	3 3
Low shrub layer (45)	soopolallie common snowberry rose	15 15 10	Rocky Mountain Douglas-fir creeping Oregon-grape common juniper Engelmann spruce	3 5 3 3
Herb layer (50)	pine grass few-flowered one-sided wintergreen star-flowered false Solomon's-seal	35 3 3	showy aster wild strawberry Canadian bunchberry northern bedstraw	10 3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
trembling aspen	common saskatoon	grouseberry
western thimbleberry	willow	
star-flowered false Solomon's-seal	twinberry honeysuckle	
Kentucky blue grass	Utah honeysuckle	
	large-leaved rattlesnake orchid	
	hawkweed	

TERRAIN AND SOILS

Terrain: deep soils of terraces and valley floor; moraine, fluvial fan, lacustrine
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: GD_2, LY_2, MZ_3
Moisture regime: mesic to hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 900-1350 m
Slope: 3-5%
Aspect: level
Landscape position: lower slope

ECOLOGY

- type is found on gentle slopes usually of good moisture availability

SUCCESSION

- normal rate of succession except on droughty, coarse-textured soils which may inhibit tree regeneration
- typical young seral vegetation in valley bottoms in the Rocky Mountains
- Successional Sequence #30

59 Lodgepole pine - soopolallie - birch-leaved spirea - pine grass - dwarf blueberry

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (65)	lodgepole pine	50	Rocky Mountain Douglas-fir	30
Tall shrub layer (10)	soopolallie Rocky Mountain Douglas-fir	5 5	Engelmann spruce trembling aspen common saskatoon	5 3 3
Low shrub layer (35)	soopolallie birch-leaved spirea	20 10	common saskatoon rose Rocky Mountain Douglas-fir creeping Oregon-grape	5 10 3 3
Herb layer (80)	pine grass heart-leaved arnica dwarf blueberry few-flowered one-sided wintergreen	60 10 5 3	wild strawberry showy aster common western pipsissewa northern twinflower	10 3 3 5
Moss, lichen and liverwort layer (15)	common moss	15	brachythecium moss lichens	5 5

CHARACTER SPECIES

Present		Absent
Rocky Mountain Douglas-fir common saskatoon willow hawkweed large-leaved rattlesnake orchid racemose pussytoes	timber milk-vetch northern hedysarum	western thimbleberry Canadian bunchberry western meadow-rue false Solomon's-seal rough-fruited fairybells

TERRAIN AND SOILS

Terrain: deep soils of lower mountain slopes; morainal blanket, fluvial level and terrace
Soil Texture: silt loam to loamy sand
Soil Association Comp: CD_1, GD_1, KE_1, MY_4
Moisture regime: mesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1000-1300 m
Slope: 3-30%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moderate moisture availability

SUCCESSION

- slow rate of succession as this type is usually associated with droughty soils
- typical young seral vegetation of fluvial terraces within the Rocky Mountains

- Successional Sequence #13, 30

60 Rocky Mountain Douglas-fir - soopolallie - pine grass - Canada violet

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing to overmature
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine Rocky Mountain Douglas-fir	40 30	trembling aspen Engelmann spruce	3 5
Tall shrub layer (10)	-		common saskatoon soopolallie Rocky Mountain Douglas-fir alpine fir	3 3 5 3
Low shrub layer (40)	soopolallie birch-leaved spirea common juniper common snowberry	20 10 5 5	Rocky Mountain Douglas-fir common saskatoon rose Utah honeysuckle	5 5 5 3
Herb layer (40)	pine grass northern twinflower heart-leaved arnica	20	kinnikinnick showy aster northwestern sedge few-flowered one-sided wintergreen	5 5 3 3
Moss, lichen and liverwort layer (25)	common moss feather moss	15 10	-	

CHARACTER SPECIES

Present	Absent
Rocky Mountain maple	twinberry honeysuckle
wild rye grass	willows
Canadian bunchberry	trembling aspen
false Solomon's-seal	
rough-fruited fairybells	
Canada violet	

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes; morainal blanket, colluvial veneer, fluvial fan
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: CT_7, GB_1, GN_1, LN_4, MD_3, RU_7
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1000-1850 m
Slope: 10-40%
Aspect: 180-270°
Landscape position: middle to lower slope

ECOLOGY

- generally areas of moisture deficiencies on warm south to west aspects
- soils of moderate acidity

SUCCESSION

- slow rate of succession due to droughty soils and southern exposure
- severe disturbance on these sites will create open forests or persistent shrub-herb community
- Successional Sequence #32

Plate 2.23 Group J. 61) Lodgepole pine - soopolallie - pine grass - wild rye grass. The vegetation of this site is dominated by lodgepole pine, soopalallie, pine grass and Canadian bunchberry, on a north-facing slope at 1050 m.

Plate 2.24 Group J. 63) Lodgepole pine - birch-leaved spirea - pine grass - American vetch. The vegetation of this type is dominated by lodgepole pine, birch-leaved spirea, pine grass and showy aster. It is on a west-facing morainal slope at 1100 m.

61 Lodgepole pine - soopolallie - pine grass - wild rye grass (see Plate 2.23)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (65)	lodgepole pine	65	-	
Tall shrub layer (5)	-		Rocky Mountain Douglas-fir Engelmann spruce	5 5
Low shrub layer (30)	soopolallie common saskatoon common snowberry rose	20 7 5 5	common juniper birch-leaved spirea	3 3
Herb layer (60)	pine grass Canadian bunchberry northern twinflower showy aster	20 15 15 5	wild strawberry heart-leaved arnica few-flowered one-sided wintergreen cream-coloured peavine	5 5 3 5
Moss, lichen and liverwort layer (30)	layered moss common moss feather moss	15 10 10	-	

CHARACTER SPECIES

Present		Absent
trembling aspen	fireweed	creeping Oregon-grape
wild rye grass		northwestern sedge
green pyrola		grouseberry
dwarf red blackberry		early blue violet
Rocky Mountain ragwort		lupines
American vetch		

TERRAIN AND SOILS

Terrain: deep soils of terraces and valley floor; fluvial terrace, morainal blanket, lacustrine terrace
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: AZ$_1$, FP$_4$, MA$_1$, MA$_2$, MA$_3$, MW$_1$
Moisture regime: mesic to subhygric
Drainage: rapid to moderately well

TOPOGRAPHY

Elevation: 1000-1400 m
Slope: 0-5%
Aspect: various
Landscape position: lower slope to valley floor

ECOLOGY

- generally favourable moisture conditions although may have rapid drainage on coarse fluvial materials
- moisture deficits in summer limit plant growth

SUCCESSION

- normal rate of succession except on droughty, coarse-textured soils
- typical young seral vegetation of valley bottom areas within the Rocky Mountains
- Successional Sequence #13, 21, 30

62 Lodgepole pine - birch-leaved spirea - pine grass - lupine

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and all subzones of subalpine zone

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine	50	western larch	20
Tall shrub layer (10)	soopolallie western larch Engelmann spruce	5 5 3	-	
Low shrub layer (25)	birch-leaved spirea common saskatoon soopolallie rose	5 7 5 5	alpine fir common juniper creeping Oregon-grape Utah honeysuckle	3 5 3 3
Herb layer (50)	pine grass dwarf blueberry northern twinflower kinnikinnick	20 10 10 3	common western pipsissewa heart-leaved arnica grouseberry lupine	3 3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
creeping Oregon-grape	twinberry honeysuckle	fireweed
grouseberry	willows	green pyrola
early blue violet	western thimbleberry	rough-leaved rice grass
common pink pyrola	trembling aspen	dwarf red blackberry
lupine	Canadian bunchberry	
	western meadow-rue	

TERRAIN AND SOILS

Terrain: deep soil of lower mountain slopes; fluvial or fluvial terrace
Soil Texture: silty clay loam to silt loam, loamy sand
Soil Association Comp: wide range of soils
Moisture regime: various
Drainage: various

TOPOGRAPHY

Elevation: 1100-1550 m
Slope: 0-20%
Aspect: various
Landscape position: valley floor

ECOLOGY

- generally moderate moisture availability; on coarse textured soils rapid drainage may result in long periods of moisture deficits; on finer textured soils better moisture conditions usually prevail

SUCCESSION

- slow rate of succession due to droughty soils
- typical vegetation of lower slope areas
- Successional Sequence #20, 30, 38

63 Lodgepole pine - birch-leaved spirea - pine grass - American vetch (see Plate 2.24)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine	50	-	
Tall shrub layer (3)	-		soopolallie	3
			common saskatoon	3
Low shrub layer (25)	birch-leaved spirea	10	common juniper	5
	creeping Oregon-grape	5	common saskatoon	5
	common snowberry	5	rose	5
			western red cedar	3
Herb layer (40)	pine grass	25	northern twinflower	5
	wild strawberry	5	showy aster	5
	heart-leaved arnica	5	dwarf blueberry	3
	Canadian bunchberry	3	western meadow-rue	3
Moss, lichen and liverwort layer (25)	common moss	20	various species	10

CHARACTER SPECIES

Present		Absent
western red cedar	Canadian bunchberry	kinnikinnick
common juniper	western meadow-rue	wild rye grass
western thimbleberry	mountain sweetcicely	stiff club-moss
Oregon boxwood	rough-leaved rice grass	common mitrewort
Rocky Mountain juniper		
American vetch		

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; fluvial fan and terrace, morainal blanket
Soil Texture: clay loam to sandy loam
Soil Association Comp: GB$_1$, KE$_1$, MA$_2$, MZ$_3$
Moisture regime: mesic to subhygric
Drainage: well

TOPOGRAPHY

Elevation: 1000-1450 m
Slope: 0-40%
Aspect: 260-290°
Landscape position: valley floor to middle slope

ECOLOGY

- generally gently sloping, moisture and nutrient receiving sites

SUCCESSION

- normal rate of succession
- fairly typical seral vegetation for adjacent areas of the two zones
- Successional Sequence #20, 33

64 Lodgepole pine - soopolallie - pine grass - stiff club-moss

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine Engelmann spruce	60 5	common paper birch	5
Tall shrub layer (5)	Engelmann spruce	5	-	
Low shrub layer (15)	Engelmann spruce rose soopolallie birch-leaved spirea	5 5 5 3	common saskatoon common snowberry Utah honeysuckle smooth Pacific menziesia	5 5 5 3
Herb layer (40)	pine grass Canadian bunchberry wild strawberry false Solomon's-seal	20 7 5 3	showy aster western meadow-rue dwarf blueberry stiff club-moss	3 3 3 3
Moss, lichen and liverwort layer (40)	common moss feather moss layered moss	20 10 10	cushion moss	.5

CHARACTER SPECIES

Present	Absent
common paper birch Engelmann spruce smooth Pacific menziesia high bush cranberry wild rye grass Douglas' aster wild sarsaparilla	western red cedar Rocky Mountain Douglas-fir common juniper evergreen yellow violet fireweed kinnikinnick western yarrow

TERRAIN AND SOILS

Terrain: terraces and valley floor, fluvial or morainal

Soil Texture: silt loam to sandy loam
Soil Association Comp: CD$_3$, FD$_1$, FP$_2$, MW$_4$
Moisture regime: mesic to subhygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1050-1250 m
Slope: 2-9%
Aspect: various
Landscape position: lower slope

ECOLOGY

- good moisture availability in these generally receiving, lower slope positions

SUCCESSION

- normal rate of succession
- typical seral vegetation of wetter valley bottom areas of adjacent areas of these two zones
- Successional Sequence #36

65 Lodgepole pine - soopolallie - Canadian bunchberry - grouseberry

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (55)	lodgepole pine	55	Engelmann spruce trembling aspen	20 20
Tall shrub layer (10)	Engelmann spruce	10	alpine fir	5
Low shrub layer (30)	soopolallie birch-leaved spirea Engelmann spruce	15 5 5	common juniper rose twinberry honeysuckle Utah honeysuckle	3 5 3 3
Herb layer (50)	Canadian bunchberry northern twinflower wild strawberry	15 10 10	common western pipsissewa few-flowered one-sided wintergreen pine grass grouseberry	5 5 20 3
Moss, lichen and liverwort layer (25)	common moss layered moss	15 10	sheet lichens cushion moss	.5 .5

CHARACTER SPECIES

Present		Absent
common juniper	grouseberry	common paper birch
smooth Pacific menziesia		western thimbleberry
evergreen yellow violet		sweet-scented bedstraw
kinnikinnick		wild sarsaparilla
common mitrewort		
fireweed		

TERRAIN AND SOILS

Terrain: deep soils of terraces and valley floor; lacustrine, colluvial, morainal
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: LN_1, LN_4, MM_1, MW_8, RU_1, SP_3
Moisture regime: hygric to mesic
Drainage: moderately well to well

TOPOGRAPHY

Elevation: 1200-1450 m
Slope: 0-7%
Aspect: various
Landscape position: lower slope

ECOLOGY

- good moisture availability on these mainly lower slope receiving sites
- lush plant growth

SUCCESSION

- normal rate of succession
- Successional Sequence #30

66 Lodgepole pine - soopolallie - pine grass - fireweed

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (65)	lodgepole pine	60	trembling aspen western larch	10 15
Tall shrub layer (10)	Engelmann spruce soopolallie	5 5	Rocky Mountain Douglas-fir	5
Low shrub layer (50)	soopolallie rose birch-leaved spirea common saskatoon	25 15 10 5	common juniper common snowberry Engelmann spruce willows	5 5 3 3
Herb layer (65)	pine grass northern twinflower common western pipsissewa	30 10 5	kinnikinnick heart-leaved arnica Canadian bunchberry showy aster	5 10 10 10
Moss, lichen and liverwort layer (20)	common moss layered moss	10 10	cushion moss	5

CHARACTER SPECIES

Present	Absent
western thimbleberry fairyslipper	smooth Pacific menziesia cream-coloured peavine evergreen yellow violet common mitrewort

TERRAIN AND SOILS

Terrain: deep or shallow soils of lower slopes or terraces; colluvial veneer, morainal, fluvial fan and terrace, lacustrine
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to hygric
Drainage: well to moderately well

TOPOGRAPHY

Elevation: 1000-1550 m
Slope: 0-20%
Aspect: various
Landscape position: lower slope

ECOLOGY

- generally good moisture availability except on sites with shallow soils
- sites of shallow soils are sensitive

SUCCESSION

- normal rate of succession
- typical seral vegetation for adjacent areas of these two zones
- Successional Sequence #13, 20, 30

Plate 2.25 Group K. 67) White spruce - western thimbleberry - sweet-scented bedstraw - star-flowered false Solomon's-seal. The vegetation of this site is dominated by common paper birch, trembling aspen and wild sarsaparilla. It is on a level fluvial area at 950 m.

Plate 2.26 Group K. 68) Western red cedar - western thimbleberry - oak fern. The vegetation of this site is dominated by western red cedar, Rocky Mountain maple, western thimbleberry and unifoliate-leaved foam flower. It is on a south-facing colluvial slope at 1250 m.

67	White spruce - western thimbleberry - sweet-scented bedstraw - star-flowered false Solomon's-seal (see Plate 2.25)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium
Zone: Interior Rocky Mountain Douglas-fir
Subzone: Lodgepole pine

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (65)	white spruce common paper birch trembling aspen	25 35 20	black cottonwood	30
Tall shrub layer (10)	Rocky Mountain maple white spruce	5 5	trembling aspen common paper birch	5 5
Low shrub layer (40)	western thimbleberry common snowberry	15 15	creeping Oregon-grape Rocky Mountain maple birch-leaved spirea common saskatoon	5 3 5 3
Herb layer (35)	sweet-scented bedstraw mountain sweetcicely	5 5	wild sarsaparilla blue-bead clintonia Canadian bunchberry star-flowered false Solomon's-seal	15 3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
trembling aspen creeping Oregon-grape common snowberry baldhip rose wild rye grass Douglas' aster star-flowered false Solomon's-seal	black blueberry fireweed dwarf blueberry northern bedstraw dwarf red blackberry

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; fluvial terrace, colluvial blanket and fan, lacustrine
Soil Texture: silty clay loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: hygric to mesic
Drainage: imperfect to well

TOPOGRAPHY

Elevation: 900-1300 m
Slope: 0-45%
Aspect: various
Landscape position: lower slope and valley floor

ECOLOGY

- succeeding to edaphic climax of white spruce communities
- good moisture and nutrient availability on lower slope receiving sites

SUCCESSION

- normal rate of succession
- leading to edaphic white spruce climax communities

68	Western red cedar - western thimbleberry - oak fern (see Plate 2.26)

VEGETATION CHARACTERISTICS

Region: Interior Wet Belt, Dry Interior
Section: Radium, Cranbrook
Successional stage: maturing climatic or edaphic climax
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Interior western red cedar, and Subalpine Engelmann spruce - alpine fir
Subzone: various subzones of the above zones

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (55)	western red cedar	45	alpine fir Rocky Mountain Douglas-fir white spruce	10 10 10
Tall shrub layer (10)	western red cedar	10	Rocky Mountain maple	7
Low shrub layer (20)	western thimbleberry western red cedar	5 10	black swamp gooseberry devil's-club black blueberry Oregon boxwood	3 10 3 3
Herb layer (30)	oak fern sweet-scented bedstraw large-leaved rattlesnake orchid cucumberroot twistedstalk	10 3 3 3	spiny shield fern common horsetail blue-bead clintonia wild sarsaparilla	3 10 3 3
Moss, lichen and liverwort layer (5)	-		common moss	10

CHARACTER SPECIES

Present	Absent
alpine fir	creeping Oregon-grape
western red cedar	common snowberry
black blueberry	western red-osier dogwood
oak fern	thin-leaved mountain alder
cucumberroot twistedstalk	wild rye grass

TERRAIN AND SOILS

Terrain: deep soils of lower slopes and terraces; fluvial terraces, morainal blanket, lacustrine
Soil Texture: silty clay loam
Soil Association Comp: AZ_2, CO_3, FQ_1, FP_4, GE_{10}, GN_{10}
Moisture regime: hygric to subhygric
Drainage: moderately well to imperfect

TOPOGRAPHY

Elevation: 950-1300 m
Slope: 0-20%
Aspect: various
Landscape position: valley floor to middle slope

ECOLOGY

- high moisture availability from precipitation and seepage
- nutrient rich areas

SUCCESSION

- normal rate of succession
- typical climax vegetation for Interior western red cedar zone and for edaphic western red cedar communities
- Successional Sequence #29, 52

69 Rocky Mountain Douglas-fir - western thimbleberry - sweet-scented bedstraw - false Solomon's-seal

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: maturing seral or edaphic climax
Stand appearance: dense mixed forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (55)	Rocky Mountain Douglas-fir	20	western red cedar	10
	black cottonwood	15	white spruce	10
	common paper birch	10		
Tall shrub layer (15)	Rocky Mountain maple	5	western red-osier dogwood	10
	western red cedar	5	thin-leaved mountain alder	3
Low shrub layer (25)	western thimbleberry	10	common saskatoon	5
	birch-leaved spirea	5	creeping Oregon-grape	3
	Rocky Mountain maple	5	Utah honeysuckle	3
	western red cedar	3	western red-osier dogwood	5
Herb layer (15)	sweet-scented bedstraw	5	wild rye grass	3
	mountain sweetcicely	5	Canadian bunchberry	3
	false Solomon's-seal	3	blue-bead clintonia	5
	Douglas' aster	3	spiny shield fern	3
Moss, lichen and liverwort layer (5)	-		brachythecium moss	5
			layered moss	5

CHARACTER SPECIES

Present	Absent
western red-osier dogwood	oak fern
thin-leaved mountain alder	cucumberroot twistedstalk
creeping Oregon-grape	
common snowberry	
wild rye grass	

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; colluvial blanket, fluvial terrace
Soil Texture: silt loam to sandy loam
Soil Association Comp: CAI_1, CN_1, CN_{10}, CR_1, CW_1, GN_1, KE_1
Moisture regime: mesic to hygric
Drainage: well to imperfect

TOPOGRAPHY

Elevation: 850-1200 m
Slope: 0-40%
Aspect: various
Landscape position: valley floor to middle slope

ECOLOGY

- leading to edaphic climax communities
- wet sites generally in lower slope receiving position
- nutrient rich, highly productive herb and shrub layers and good productivity for trees

SUCCESSION

- normal rate of succession
- leading to edaphic climax communities of western red cedar
- Successional Sequence #29, 52

70 White spruce - willow - sedge - common pink pyrola

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing edaphic climax
Stand appearance: open coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (40)	white spruce	40	black cottonwood	20
Tall shrub layer (20)	thin-leaved mountain alder western red-osier dogwood white spruce	10 7 7	willow	3
Low shrub layer (20)	willow western red-osier dogwood thin-leaved mountain alder baldhip rose	5 10 5 3	twinberry honeysuckle	10
Herb layer (20)	sedges Canadian bunchberry common pink pyrola	10	wild rye grass sweet-scented bedstraw dwarf scouring-rush common horsetail	5 3 3 3
Moss, lichen and liverwort layer (5)	-		brachythecium moss	5

CHARACTER SPECIES

Present	Absent
white spruce thin-leaved mountain alder baldhip rose twinberry honeysuckle Canadian bunchberry northern twinflower sedges common pink pyrola	trembling aspen Rocky Mountain maple baldhip rose bristly Nootka rose black swamp gooseberry common dandelion western meadow-rue star-flowered false Solomon's-seal drooping brome grass

TERRAIN AND SOILS

Terrain: depressional organic or floodplain soils

Soil Texture: organic, loamy sand
Soil Association Comp: CN_1, OD_1, OS_1
Moisture regime: subhygric to subhydric
Drainage: imperfect to poor

TOPOGRAPHY

Elevation: 1000-1550 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- areas of high water table and poor drainage
- cold air drainage and accumulation
- excessive moisture during peak water levels

SUCCESSION

- slow rate of succession
- Successional Sequence #25

Plate 2.27 Group L. 71) Trembling aspen - common snowberry - willow - star-flowered false Solomon's-seal. The vegetation of this site is dominated by trembling aspen, black cottonwood and western red-osier dogwood, on a floodplain at 800 m.

Plate 2.28 Group L. 75) Engelmann spruce - common snowberry - northern twinflower - dwarf red blackberry. The vegetation of this type is on a river terrace at 1200 m. It is dominated by Engelmann spruce, common snowberry, dwarf red blackberry, common horsetail and mosses.

71	Trembling aspen - common snowberry - willow - star-flowered false Solomon's-seal (see Plate 2.27)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: young seral
Stand appearance: dense broad-leaved forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (65)	trembling aspen	65	black cottonwood	30
Tall shrub layer (20)	western red-osier dogwood willow	10 5	Rocky Mountain maple common saskatoon trembling aspen	3 3 10
Low shrub layer (20)	western red-osier dogwood common snowberry willow	10 5 3	common saskatoon high bush cranberry baldhip rose	5 3 3
Herb layer (10)	star-flowered false Solomon's-seal common dandelion	3 3	wild rye grass mountain sweetcicely common horsetail thistles	5 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present

- black cottonwood
- Rocky Mountain maple
- common saskatoon
- high bush cranberry
- common dandelion
- star-flowered false Solomon's-seal

Absent

- white spruce
- black swamp gooseberry
- soopolallie
- creeping Oregon-grape
- thin-leaved mountain alder
- showy aster
- northern twinflower
- western meadow-rue
- northern bedstraw

TERRAIN AND SOILS

Terrain: floodplain

Soil Texture: silt loam
Soil Association Comp: S_2, S_3
Moisture regime: hygric
Drainage: poor to imperfect

TOPOGRAPHY

Elevation: 750-800 m
Slope: 0-5%
Aspect: level
Landscape position: valley floor

ECOLOGY

- watertable levels may vary considerably over the annual cycle
- recently deposited soils (regosols)
- wet areas with high water table and subject to flooding but sometimes quite dry during low runoff periods

SUCCESSION

- slow rate of succession due to a high water table which restricts regeneration
- leading to edaphic communities of white spruce
- Successional Sequence #23

72 White spruce - western red-osier dogwood - star-flowered false Solomon's-seal - Douglas' aster

VEGETATION CHARACTERISTICS

Region: Dry Interior

Section: Radium, Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: all subzones

Successional stage: young seral to edaphic climax

Stand appearance: dense, mixed or coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	white spruce	30	trembling aspen common paper birch	40 30
Tall shrub layer (15)	white spruce	10	Rocky Mountain Douglas-fir common paper birch willow	3 10 3
Low shrub layer (15)	common saskatoon creeping Oregon-grape western red-osier dogwood white spruce	3 3 3 3	willow Rocky Mountain Douglas-fir common snowberry soopolallie	5 3 3 5
Herb layer (10)	star-flowered false Solomon's-seal northern twinflower Douglas' aster	3 3 3	Canadian bunchberry sedge cream-coloured peavine rough-leaved rice grass	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
white spruce creeping Oregon-grape common juniper common saskatoon northern twinflower sedges rough-leaved rice grass star-flowered false Solomon's-seal	western thimbleberry Rocky Mountain maple high bush cranberry

TERRAIN AND SOILS

Terrain: floodplain soils with fluvial, lacustrine or organic material

Soil Texture: sandy loam, organic

Soil Association Comp: FF$_1$, NW$_{11}$, OL$_1$, S$_3$, S$_{10}$

Moisture regime: subhygric to subhydric

Drainage: moderately well to poor

TOPOGRAPHY

Elevation: 750-1050 m

Slope: 0-7%

Aspect: level

Landscape position: valley floor to lower slope

ECOLOGY

- wet sites in receiving moisture positions
- possible flooding

SUCCESSION

- normal rate of succession except when a high water table inhibits tree regeneration
- leading to edaphic climax communities of white spruce

73 Willow - twinberry honeysuckle - wild rye grass - common cow-parsnip

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: pioneer seral
Stand appearance: pioneer shrub

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (3)	-		Rocky Mountain Douglas-fir	3
Tall shrub layer (10)	willow	10	Engelmann spruce	5
Low shrub layer (40)	twinberry honeysuckle willow black swamp gooseberry western red-osier dogwood	20 5 10 5	western thimbleberry Rocky Mountain maple birch-leaved spirea Sitka mountain-ash	5 3 3 3
Herb layer (25)	wild rye grass common cow-parsnip fireweed	10 7 5	western meadow-rue sweet-scented bedstraw Douglas' aster common horsetail	5 3 5 5
Moss, lichen and liverwort layer (5)	-		cushion moss	5

CHARACTER SPECIES

Present	Absent	
willow western thimbleberry Rocky Mountain maple common cow-parsnip	trembling aspen common snowberry Canadian bunchberry northern bedstraw cream-coloured peavine rough-leaved rice grass	wild sarsaparilla star-flowered false Solomon's-seal common mitrewort

TERRAIN AND SOILS

Terrain: valley floor fluvial materials

Soil Texture: silt loam to sandy loam
Soil Association Comp: FF_1, FV_2, FU_3
Moisture regime: subhygric to hygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 1150-1450 m
Slope: 0-5%
Aspect: level
Landscape position: valley floor to lower slope

ECOLOGY

- generally receiving sites with good moisture and nutrient availability
- dense shrub cover may inhibit the establishment of trees

SUCCESSION

- slow rate of succession as dense shrub cover restricts tree regeneration

74 Trembling aspen - common snowberry - wild rye grass - cream-coloured peavine

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: young seral
Stand appearance: dense broad-leaved forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (80)	trembling aspen	80	Engelmann spruce	3
Tall shrub layer (5)	-		thin-leaved mountain alder Rocky Mountain Douglas-fir	3 3
Low shrub layer (50)	common snowberry black swamp gooseberry baldhip rose	35 10 5	common juniper soopolallie western red-osier dogwood bristly Nootka rose	3 10 5 5
Herb layer (40)	wild rye grass Douglas' aster Canadian bunchberry	10 10 10	western meadow-rue sweet-scented bedstraw cream-coloured peavine wild sarsaparilla	3 3 3 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present

trembling aspen
common snowberry
Canadian bunchberry
cream-coloured peavine
wild sarsaparilla
star-flowered false Solomon's-seal
pine grass

Absent

lodgepole pine
willow
Utah honeysuckle
twinberry honeysuckle
northern twinflower
few-flowered one-sided wintergreen
dwarf scouring-rush
common mitrewort
dwarf red blackberry

TERRAIN AND SOILS

Terrain: lacustrine terraces

Soil Texture: silt loam to silty clay loam
Soil Association Comp: AZ_2, AZ_3
Moisture regime: subhygric
Drainage: imperfect to moderately well

TOPOGRAPHY

Elevation: 1050 m
Slope: 2-19%
Aspect: various
Landscape position: lower slope to valley floor

ECOLOGY

- receiving sites of lacustrine material with good moisture holding capacity
- lush understory reflect rich soils

SUCCESSION

- slow succession to a coniferous sequence
- may possibly succeed to a white spruce climax
- typical broad-leaved succession on moist lacustrine materials in this subzone
- Successional Sequence #28

75	**Engelmann spruce - common snowberry - northern twinflower - dwarf red blackberry (see Plate 2.2B)**

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: young to overmature seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	Engelmann spruce	40	trembling aspen alpine fir	30 20
Tall shrub layer (5)	Engelmann spruce	5	-	
Low shrub layer (15)	Engelmann spruce common snowberry western red-osier dogwood common saskatoon	3 5 3 3	rose twinberry honeysuckle Utah honeysuckle willows	3 5 3 3
Herb layer (15)	northern twinflower Canadian bunchberry wild rye grass	3 5 3	western meadow-rue common horsetail rough-leaved rice grass Douglas' aster	5 5 3 3
Moss, lichen and liverwort layer (15)	-		common moss feather moss	10 10

CHARACTER SPECIES

Present		Absent
Engelmann spruce Utah honeysuckle northern twinflower few-flowered one-sided wintergreen Douglas' aster rough-leaved rice grass	dwarf scouring-rush common mitrewort dwarf red blackberry	Rocky Mountain Douglas-fir birch-leaved spirea Rocky Mountain maple pine grass Rocky Mountain ragwort

TERRAIN AND SOILS

Terrain: floodplain

Soil Texture: silt loam to sandy loam
Soil Association Comp: FU_1, FU_3, FZ_1, GN_{10}, S_{11}
Moisture regime: hygric
Drainage: imperfect to moderately well

TOPOGRAPHY

Elevation: 950-1300 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- cold air drainage suppresses productivity
- rich, moist sites with possibility of flooding

SUCCESSION

- normal rate of succession
- leading to edaphic climax communities dominated by Engelmann spruce (although alpine fir may be present)
- Successional Sequence #49

76 Engelmann spruce - common snowberry - Canadian bunchberry - false Solomon's-seal

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	Engelmann spruce	50	Rocky Mountain Douglas-fir trembling aspen	20 10
Tall shrub layer (5)	-		Engelmann spruce western red-osier dogwood	5 5
Low shrub layer (30)	common snowberry common saskatoon rose black swamp gooseberry	10 5 5 5	twinberry honeysuckle Utah honeysuckle western red-osier dogwood high bush cranberry	3 3 3 3
Herb layer (35)	Canadian bunchberry northern twinflower sweet-scented bedstraw mountain sweetcicely	10 7 5 5	wild sarsaparilla red baneberry showy aster rough-fruited fairybells	5 3 3 3
Moss, lichen and liverwort layer (25)	feather moss layered moss	15 10	-	

CHARACTER SPECIES

Present		Absent
Engelmann spruce birch-leaved spirea smooth Pacific menziesia northwestern sedge rough-fruited fairybells red baneberry	Rocky Mountain ragwort one-flowered wintergreen	common juniper baldhip rose western yarrow Douglas' aster

TERRAIN AND SOILS

Terrain: valley floor or floodplain; fluvial, morainal blanket, colluvial fan
Soil Texture: silt loam to sandy loam
Soil Association Comp: CB_7, FF_1, FO_4, FU_3, MA_7, S_{11}
Moisture regime: subhygric to hygric
Drainage: moderately well to imperfect

TOPOGRAPHY

Elevation: 1000-1350 m
Slope: 0-15%
Aspect: various
Landscape position: valley floor

ECOLOGY

- cool, rich sites; cold air drainage, limiting productivity somewhat
- high water table with possible flooding

SUCCESSION

- normal rate of succession
- generally leads to edaphic climax communities dominated by Engelmann spruce (although alpine fir may be present)
- typical mature vegetation for valley bottom sites
- Successional Sequence #49

77 White spruce - common snowberry - Canadian bunchberry - star-flowered false Solomon's-seal

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine and Lodgepole pine

Successional stage: young to maturing seral
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	white spruce	40	lodgepole pine trembling aspen Rocky Mountain Douglas-fir	15 30 10
Tall shrub layer (5)	white spruce	5	trembling aspen Rocky Mountain Douglas-fir	3 3
Low shrub layer (20)	common snowberry creeping Oregon-grape soopolallie white spruce	7 3 3 3	common saskatoon Rocky Mountain Douglas-fir birch-leaved spirea high bush cranberry	3 3 5 3
Herb layer (30)	Canadian bunchberry pine grass western meadow-rue sweet-scented bedstraw	10 10 3 3	few-flowered one-sided wintergreen fireweed northern twinflower star-flowered false Solomon's-seal	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent	
white spruce	wood strawberry	Engelmann spruce	one-flowered wintergreen
Rocky Mountain Douglas-fir		Utah honeysuckle	
common juniper		smooth Pacific menziesia	
baldhip rose		northwestern sedge	
pine grass		early blue violet	
fireweed		Rocky Mountain ragwort	

TERRAIN AND SOILS

Terrain: fluvial level (floodplain) and fan

Soil Texture: silty clay loam to sandy loam
Soil Association Comp: FF_3, FZ_1, KE_1, S_1
Moisture regime: mesic to hygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 750-1250 m
Slope: 0-15%
Aspect: various
Landscape position: lower slope to valley floor

ECOLOGY

- generally wet areas in receiving moisture positions
- rich sites with relatively high base status of soils

SUCCESSION

- normal rate of succession
- leads to edaphic climax communities of white spruce
- Successional Sequence #28

112 Engelmann spruce - black swamp gooseberry - common horsetail

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

Successional stage: maturing climatic climax
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	Engelmann spruce	50	alpine fir black cottonwood	15 5
Tall shrub layer (10)	-		Engelmann spruce alpine fir thin-leaved mountain alder	5 5 5
Low shrub layer (10)	black swamp gooseberry	5	thin-leaved mountain alder	5
Herb layer (90)	common horsetail	70	western meadow-rue sweet-scented bedstraw wild rye grass palmate colt's-foot	5 5 5 5
Moss, lichen and liverwort layer (20)	-		common moss	10

CHARACTER SPECIES

Present	Absent	
-	trembling aspen common snowberry western red-osier dogwood high bush cranberry rough-fruited fairybells rough-leaved rice grass	wild sarsaparilla

TERRAIN AND SOILS

Terrain: floodplain

Soil Texture: sandy loam
Soil Association Comp: FE_1
Moisture regime: hygric
Drainage: imperfect

TOPOGRAPHY

Elevation: 1450 m
Slope: level
Aspect: level
Landscape position: valley floor receiving site

ECOLOGY

- wet and nutrient rich site at base of slope
- high water table part of the year which may restrict tree growth, because of poor aeration

SUCCESSION

- slow rate of succession
- leading to an edaphic climax dominated by Engelmann spruce (although alpine fir may be present)
- typical vegetation for valley bottoms of this zone
- Succession Sequence #48

113 White spruce - common horsetail - palmate colt's foot - common moss

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: young edaphic climax
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (70)	white spruce	70	-	
Tall shrub layer (0)	-		-	
Low shrub layer (5)	-		western red-osier dogwood baldhip rose twinberry honeysuckle Utah honeysuckle	2 2 2 2
Herb layer (50)	common horsetail palmate colt's-foot	35 10	dwarf red blackberry fireweed common cow-parsnip green pyrola	2 2 2 2
Moss, lichen and liverwort layer (60)	common moss feather moss	30 20	layered moss sheet lichens fruticose lichens	10 2 2

CHARACTER SPECIES

Present	Absent
white spruce	common snowberry
baldhip rose	black swamp gooseberry
Utah honeysuckle	pine grass
common cow-parsnip	western meadow-rue
wood strawberry	sweet-scented bedstraw
	wild sarsaparilla
	dwarf scouring-rush
	rough-leaved rice grass

TERRAIN AND SOILS

Terrain: floodplain

Soil Texture: sandy loam
Soil Association Comp: MA_{10}
Moisture regime: hygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 1200 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- moisture and nutrient rich site in receiving position
- high water table part of the year leaving poorly aerated soils
- limited soil aeration is not limiting productivity

SUCCESSION

- normal rate of succession
- edaphic climax of white spruce
- typical climax vegetation for valley bottom areas in this zone
- Succession Sequence #26

114	Lodgepole pine - white spruce - baldhip rose - wild rye grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Western larch - ponderosa pine

Successional stage: maturing seral
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine	40	black cottonwood white spruce	10 2
Tall shrub layer (15)	-		western red-osier dogwood baldhip rose white spruce	5 5 2
Low shrub layer (70)	baldhip rose	50	western thimbleberry common snowberry birch-leaved spirea white spruce	5 5 5 2
Herb layer (5)	wild rye grass	5	Columbia lily common horsetail	2 2
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
western larch baldhip rose wild rye grass	Rocky Mountain Douglas-fir high bush cranberry black swamp gooseberry western red-osier dogwood pine grass sweet-scented bedstraw	wild sarsaparilla

TERRAIN AND SOILS

Terrain: floodplain

Soil Texture: sandy
Soil Association Comp: GN_1
Moisture regime: subhygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 950 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- receiving position may be subjected to flooding
- soils are nutrient enriched and have moderately high base status

SUCCESSION

- normal rate of succession
- leading to an edaphic climax of white spruce
- fairly typical creekside vegetation within this zone
- Succession Sequence #27

78	Rocky Mountain Douglas-fir - common juniper - pine grass - heart-leaved arnica

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: all subzones

Successional stage: maturing to overmature seral
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (55)	Rocky Mountain Douglas-fir	40	lodgepole pine ponderosa pine western larch	20 15 10
Tall shrub layer (25)	Rocky Mountain Douglas-fir	15	lodgepole pine Rocky Mountain juniper	7 3
Low shrub layer (25)	common juniper soopolallie creeping Oregon-grape Rocky Mountain Douglas-fir	5 5 3 5	birch-leaved spirea common saskatoon common snowberry Rocky Mountain juniper	3 5 5 3
Herb layer (60)	pine grass kinnikinnick heart-leaved arnica American vetch	35 5 5 3	western yarrow showy aster field pussytoes elegant death-camas	3 3 3 3
Moss, lichen and liverwort layer (5)	-		small cushion moss	5

CHARACTER SPECIES

Present	Absent
ponderosa pine rosy pussytoes American vetch	timber milk-vetch northern bedstraw racemose pussytoes

TERRAIN AND SOILS

Terrain: deep soils of lower mountain slopes; fluvial terrace, morainal blanket, colluvial blanket and veneer
Soil Texture: sandy loam
Soil Association Comp: COL_1, CR_1, E_2, KE_1, MD_1, RY_6, WY_1
Moisture regime: mesic to submesic
Drainage: well

TOPOGRAPHY

Elevation: 850-1500 m
Slope: 5-30%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moisture deficits during much of summer

SUCCESSION

- normal rate of succession
- typical seral vegetation for average sites of the Lodgepole pine subzone and for protected sites in the lower two subzones of the Interior Rocky Mountain Douglas-fir zone
- Successional Sequence #18

79 Lodgepole pine - soopolallie - pine grass - kinnikinnick

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: all subzones

Successional stage: young to overmature seral
Stand appearance: dense to open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	lodgepole pine	40	Rocky Mountain Douglas-fir	30
Tall shrub layer (15)	lodgepole pine	10	Rocky Mountain Douglas-fir	10
Low shrub layer (25)	soopolallie common saskatoon birch-leaved spirea Rocky Mountain Douglas-fir	5 10 5 3	creeping Oregon-grape common juniper common snowberry	5 3 5
Herb layer (50)	pine grass kinnikinnick western yarrow wild strawberry	25 10 3 5	field pussytoes showy aster heart-leaved arnica three-spot mariposa lily	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
field pussytoes racemose pussytoes three-spot mariposa lily northern bedstraw American vetch	rough fescue western mountainbells fairyslipper

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; fluvial terrace, morainal blanket, colluvial blanket and veneer, lacustrine
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 850-1350 m
Slope: 0-50%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moisture deficits through much of the summer
- high concentrations of lime further emphasize droughty conditions

SUCCESSION

- normal rate of succession except when associated with droughty, coarse-textured soils
- typical seral vegetation for the Lodgepole pine subzone on average sites and on protected, moister sites of the lower two subzones
- Successional Sequences #13, 19

80	Rocky Mountain Douglas-fir - soopolallie - pine grass - yellow penstemon

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: young seral to climatic climax
Stand appearance: open to dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (50)	Rocky Mountain Douglas-fir	40	lodgepole pine	20
Tall shrub layer (10)	Rocky Mountain Douglas-fir	7	trembling aspen lodgepole pine	3 10
Low shrub layer (20)	Rocky Mountain Douglas-fir soopolallie birch-leaved spirea common juniper	5 3 3 3	common saskatoon common snowberry rose Rocky Mountain juniper	3 5 3 3
Herb layer (50)	pine grass kinnikinnick timber milk-vetch yellow penstemon	30 5 3 3	wild strawberry showy aster racemose pussytoes northern bedstraw	3 5 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
timber milk-vetch yellow penstemon	three-spot mariposa lily American vetch large-leaved rattlesnake orchid sulphur hedysarum Hooker's fairybells

TERRAIN AND SOILS

Terrain: deep or shallow soils of lower mountain slopes; colluvial blanket and veneer, lacustrine
Soil Texture: silt loam
Soil Association Comp: BF_6, CR_1, FX_1, M_1, MD_1
Moisture regime: mesic to subxeric
Drainage: well

TOPOGRAPHY

Elevation: 900-1600 m
Slope: 3-60%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moisture deficits for much of the summer
- generally on south to southwest aspects at higher elevations
- high lime concentration further emphasize droughty conditions and limit rooting depths

SUCCESSION

- generally slow rate of succession due to droughty conditions of southern exposures
- fairly typical mature vegetation for southern exposures at higher elevations of this subzone
- severe disturbance may result in an open forest or a persistent shrub-grassland community
- Successional Sequence #18

81 Rocky Mountain Douglas-fir - birch-leaved spirea - pine grass - racemose pussytoes

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: maturing climatic climax
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	Rocky Mountain Douglas-fir	60	western larch	3
Tall shrub layer (5)	Rocky Mountain Douglas-fir	5	Rocky Mountain maple	3
Low shrub layer (20)	birch-leaved spirea Rocky Mountain Douglas-fir common juniper soopolallie	10 5 5 5	Rocky Mountain juniper common saskatoon creeping Oregon-grape common snowberry	5 3 3 3
Herb layer (40)	pine grass wild strawberry showy aster heart-leaved arnica	30 3 3 3	nodding onion kinnikinnick timber milk-vetch large-leaved rattlesnake orchid	3 3 3 3
Moss, lichen and liverwort layer (5)	-		various species	10

CHARACTER SPECIES

Present		Absent	
Rocky Mountain maple	Hooker's fairybells	ponderosa pine	Douglas' aster
Rocky Mountain juniper		lodgepole pine	brown-eyed Susan
nodding onion		Utah honeysuckle	
large-leaved rattlesnake orchid		cream-coloured peavine	
racemose pussytoes		common pearly everlasting	
timber milk-vetch		yellow penstemon	

TERRAIN AND SOILS

Terrain: deep to shallow soils of lower mountain slopes; colluvial blanket, veneer, apron; morainal, fluvial
Soil Texture: silt loam to sandy loam
Soil Association Comp: CR$_1$, CR$_7$, FX$_1$, MD$_1$, RS$_7$
Moisture regime: mesic to submesic
Drainage: well

TOPOGRAPHY

Elevation: 850-1350 m
Slope: 10-65%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- climax forest on various habitats
- moderate moisture deficit through much of summer and lime accumulation in soil deeper down
- mallow ninebark may rarely dominate the shrub layer

SUCCESSION

- normal rate of succession except on droughty, shallow soils which may inhibit tree regeneration
- typical climax vegetation for this subzone
- Successional Sequence #12, 20

Plate 2.29 Group M. 82) Rocky Mountain Douglas-fir - birch-leaved spirea - pine grass - heart-leaved arnica. The vegetation of this site is dominated by Rocky Mountian Douglas-fir, pine grass and heart-leaved arnica. It is on a north-facing morainal slope at 900 m.

Plate 2.30 Group N. 87) Lodgepole pine - soopolallie - pine grass - sulphur hedysarum. The vegetation of this site is dominated by Rocky Mountain Douglas-fir, birch-leaved spirea, pine grass and heart-leaved arnica. It is on a north-facing morainal slope at 1000 m.

82 Rocky Mountain Douglas-fir - birch-leaved spirea - pine grass - heart-leaved arnica (see Plate 2.29)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: maturing seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Western larch - ponderosa pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (55)	Rocky Mountain Douglas-fir	55	western larch ponderosa pine	3 3
Tall shrub layer (10)	Rocky Mountain Douglas-fir	10	-	
Low shrub layer (30)	birch-leaved spirea Rocky Mountain Douglas-fir common saskatoon common snowberry	7 10 3 3	soopolallie creeping Oregon-grape rose Utah honeysuckle	3 3 3 3
Herb layer (50)	pine grass heart-leaved arnica arrow-leaved balsamroot kinnikinnick	30 10 3 3	field pussytoes western yarrow showy aster sulphur hedysarum	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
ponderosa pine arrow-leaved balsamroot	common juniper Rocky Mountain juniper nodding onion large-leaved rattlesnake orchid yellow penstemon Hooker's fairybells	racemose pussytoes

TERRAIN AND SOILS

Terrain: lower mountain slopes of deep moraine or colluvium

Soil Texture: silt loam to sandy loam
Soil Association Comp: COL$_1$, WY$_1$
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 750-900 m
Slope: 7-50%
Aspect: 0-50°
Landscape position: middle to lower slope

ECOLOGY

- on protected aspects with favourable moisture conditions
- moisture deficits in summer months

SUCCESSION

- fast rate of succession for this subzone
- typical mature vegetation for protected, moist sites within this subzone
- Successional Sequence #11

83 Rocky Mountain Douglas-fir - lodgepole pine - birch-leaved spirea - pine grass - northern bedstraw

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: young to overmature seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine, and Western larch - ponderosa pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (65)	Rocky Mountain Douglas-fir western larch lodgepole pine	35 10 25	-	
Tall shrub layer (10)	Rocky Mountain Douglas-fir	10	western larch	5
Low shrub layer (20)	Rocky Mountain Douglas-fir birch-leaved spirea creeping Oregon-grape soopolallie	3 5 5 3	common snowberry rose common saskatoon	5 3 3
Herb layer (50)	pine grass wild strawberry heart-leaved arnica kinnikinnick	30 3 10 3	racemose pussytoes western yarrow showy aster northern bedstraw	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
lodgepole pine western larch soopolallie common juniper western larch racemose pussytoes yellow penstemon nodding onion	Oregon boxwood sulphur hedysarum arrow-leaved balsamroot

TERRAIN AND SOILS

Terrain: deep soils of lower mountain slopes and valley floor; moraine, lacustrine, fluvial
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 750-1050 m
Slope: 0-25%
Aspect: various
Landscape position: middle slope to valley floor

ECOLOGY

- moisture deficits during summer months
- lime accumulation in the soil is somewhat deeper and base saturation in upper parts of the soil is somewhat reduced over parent material

SUCCESSION

- normal rate of succession
- typical seral vegetation for the Lodgepole pine subzone and for protected, moister areas of the Western larch - ponderosa pine subzone
- Successional Sequence #11, 20

84	Rocky Mountain Douglas-fir - common saskatoon - pine grass - round-leaved alumroot

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Successional stage: climax
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	Rocky Mountain Douglas-fir	60	-	
Tall shrub layer (5)	Rocky Mountain Douglas-fir	5	Rocky Mountain maple	5
Low shrub layer (10)	common saskatoon creeping Oregon-grape	5 5	Oregon boxwood Rocky Mountain maple birch-leaved spirea	5 3 15
Herb layer (15)	pine grass round-leaved alumroot	5 3	nodding onion showy aster heart-leaved arnica common harebell	3 3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
Oregon boxwood	western larch
Rocky Mountain maple	lodgepole pine
common harebell	soopolallie
false Solomon's-seal	kinnikinnick
western blue clematis	northern twinflower
Hooker's fairybells	Douglas' aster

TERRAIN AND SOILS

Terrain: shallow or deep soils of mountain slopes; fluvial, colluvial blanket and veneer
Soil Texture: sandy loam to loamy sand
Soil Association Comp: CAI_1, E_1, FX_1, RH_1
Moisture regime: mesic to subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 750-1900 m
Slope: 40-55%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- severe moisture deficits particularly when found on southern aspects (generally at higher elevations)
- mallow ninebark may dominate the shrub layer

SUCCESSION

- normal rate of succession in the Interior Rocky Mountain Douglas-fir zone, slow rate of succession when found in the Subalpine Engelmann spruce - alpine fir zone or on shallow, droughty soils
- typical young to maturing climax in lower zone and edaphic climax in the Subalpine zone
- Successional Sequence #17

85 Rocky Mountain Douglas-fir - birch-leaved spirea - kinnikinnick - nodding onion

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: various
Stand appearance: open coniferous forest

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Lodgepole pine, Ponderosa pine, Western larch - ponderosa pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	Rocky Mountain Douglas-fir	30	western larch trembling aspen	10 10
Tall shrub layer (15)	Rocky Mountain Douglas-fir	15	common saskatoon trembling aspen	3 3
Low shrub layer (20)	birch-leaved spirea Rocky Mountain Douglas-fir common snowberry	5 5 5	common juniper common saskatoon creeping Oregon-grape	10 5 3
Herb layer (25)	kinnikinnick pine grass nodding onion three-spot mariposa lily	5 10 3 3	western yarrow false Solomon's-seal Douglas' aster heart-leaved arnica	3 3 3 10
Moss, lichen and liverwort layer (10)	-		feather moss cushion moss	10 5

CHARACTER SPECIES

Present	Absent
common juniper common snowberry kinnikinnick false Solomon's-seal Douglas' aster small flowered blue-eyed Mary field pussytoes showy aster	Oregon boxwood arrow-leaved balsamroot

TERRAIN AND SOILS

Terrain: deep or shallow slopes of mountain slopes or terraces; fluvial, morainal, colluvial veneer
Soil Texture: sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to xeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 800-1650 m
Slope: 5-60%
Aspect: various
Landscape position: middle slope

ECOLOGY

- moisture deficits associated with steep southern exposures particularly when associated with shallow soils
- soils somewhat lower in lime content in upper parts of the soil
- mallow ninebark may dominate the shrub layer

SUCCESSION

- slower than normal rate of succession especially on droughty, coarse-textured or shallow soils where tree regeneration is inhibited
- Successional Sequence #11, 19, 32

86	Rocky Mountain Douglas-fir - pine grass - three-spot mariposa lily

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: young to maturing climatic climax
Stand appearance: dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (45)	Rocky Mountain Douglas-fir	40	western larch	5
Tall shrub layer (10)	Rocky Mountain Douglas-fir western larch	10 3	willow	3
Low shrub layer (15)	Rocky Mountain Douglas-fir common saskatoon creeping Oregon-grape	5 5 5	-	
Herb layer (30)	pine grass heart-leaved arnica wood strawberry	15 10 3	kinnikinnick wild strawberry western meadow-rue arrow-leaved balsamroot three-spot mariposa lily	3 5 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
willows	lodgepole pine
arrow-leaved balsamroot	soopolallie
three-spot mariposa lily	common juniper
western yarrow	common snowberry
wood strawberry	showy aster

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes; morainal blankets

Soil Texture: silt loam
Soil Association Comp: MS_2, MS_4
Moisture regime: mesic to submesic
Drainage: well

TOPOGRAPHY

Elevation: 950-1550 m
Slope: 20-40%
Aspect: 160-200°
Landscape position: middle slope

ECOLOGY

- sites generally on south to west exposures with relatively high moisture deficits but moderate annual moisture supply

SUCCESSION

- normal rate of succession
- typical mature vegetation for average sites in this subzone
- Successional Sequence #20

87 Lodgepole pine - soopolallie - pine grass - sulphur hedysarum (see Plate 2.30)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Successional stage: young seral
Stand appearance: dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (60)	lodgepole pine	65	Rocky Mountain Douglas-fir	60
Tall shrub layer (10)	western larch willows Rocky Mountain Douglas-fir	3 3 5	-	
Low shrub layer (25)	soopolallie birch-leaved spirea common snowberry Rocky Mountain Douglas-fir	10 10 3 3	creeping Oregon-grape rose common saskatoon	3 3 3
Herb layer (60)	pine grass heart-leaved arnica	40 10	kinnikinnick northern twinflower sulphur hedysarum	3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
willow soopolallie sulphur hedysarum rough fescue dwarf blueberry western meadow-rue	trembling aspen western yarrow showy aster fireweed

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes or terraces; morainal blanket, fluvial terrace
Soil Texture: silt loam to sandy loam
Soil Association Comp: K_1, KE_1, MD_1, MS_1
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 950-1100 m
Slope: 5-35%
Aspect: 25-120°
Landscape position: middle slope

ECOLOGY

- moderate moisture availability for this subzone; moisture deficits in summer months

SUCCESSION

- normal rate of succession except on droughty, coarse-textured soils where tree regeneration is inhibited
- typical young seral vegetation for average sites in this subzone
- Successional Sequence #20

88 Western larch - Rocky Mountain Douglas-fir - creeping Oregon-grape - heart-leaved arnica - kinnikinnick

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine, Western larch - ponderosa pine

Successional stage: maturing to overmature seral
Stand appearance: open to dense coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (40)	Rocky Mountain Douglas-fir western larch	10 30	trembling aspen lodgepole pine	3 40
Tall shrub layer (10)	Rocky Mountain Douglas-fir	10	western larch	5
Low shrub layer (20)	creeping Oregon-grape Wood's rose	10 5	Rocky Mountain Douglas-fir birch-leaved spirea common saskatoon common snowberry	10 3 3 3
Herb layer (25)	heart-leaved arnica kinnikinnick wild strawberry pine grass	15 3 3 3	nodding onion northern twinflower dwarf blueberry fireweed	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
Utah honeysuckle	soopolallie	sulphur hedysarum
nodding onion	common juniper	
fireweed	common western pipsissewa	
Hooker's fairybells	northwestern sedge	
	early blue violet	
	western blue clematis	

TERRAIN AND SOILS

Terrain: morainal blanket of lower mountain slope

Soil Texture: clay loam to silt loam
Soil Association Comp: K_3, MS_1
Moisture regime: mesic to submesic
Drainage: well

TOPOGRAPHY

Elevation: 900-1100 m
Slope: 40-55%
Aspect: various
Landscape position: middle slope

ECOLOGY

- moisture deficit through summer months
- species poor herb layer

SUCCESSION

- normal rate of succession
- Successional Sequence #11, 20

Plate 2.31 Group N. 89) Western larch - soopolallie - pine grass - western yarrow. The vegetation of this site is dominated by western larch, ponderosa pine, pine grass and kinnikinnick. It is on a west-facing fluvial slope at 850 m.

Plate 2.32 Group O. 92) Trembling aspen - common saskatoon - pine grass - western yarrow. The vegetation of this site is dominated by trembling aspen, soopolallie, kinnikinnick and nodding onion. It is found on a steep southwest-facing slope of coarse-textured colluvium at 1900 m. This site has had a severe fire in the past.

89	Western larch - soopolallie - pine grass - western yarrow (see Plate 2.31)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine, and Western larch - ponderosa pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (40)	western larch	20	Rocky Mountain Douglas-fir lodgepole pine	15 20
Tall shrub layer (5)	Rocky Mountain Douglas-fir	5	western larch	5
Low shrub layer (35)	soopolallie birch-leaved spirea creeping Oregon-grape	15 15 15	Rocky Mountain Douglas-fir common snowberry common juniper common saskatoon	5 5 5 5
Herb layer (40)	pine grass kinnikinnick heart-leaved arnica	20 10 5	western yarrow wild strawberry showy aster	3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent
common juniper willows trembling aspen western larch common western pipsissewa northwestern sedge	early blue violet western blue clematis	nodding onion

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes or terraces; morainal blanket, fluvial, lacustrine, colluvial veneer
Soil Texture: silty clay loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to submesic
Drainage: well

TOPOGRAPHY

Elevation: 850-1250 m
Slope: 0-65%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- found on various habitats with soil moisture deficits in summer
- some leaching of lime from upper parts of the soil occurs

SUCCESSION

- normal rate of succession except on droughty soils
- typical young seral, western larch dominated community for average sites in the Lodgepole pine subzone and in moist, protected sites within the Western larch - ponderosa pine subzone
- Successional Sequence #11 and 12

90 Soopolallie - rough fescue - wild strawberry

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: pioneer seral
Stand appearance: pioneer shrub

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine, and Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (5)	-		whitebark pine	5
Low shrub layer (10)	common juniper soopolallie	3 3	common saskatoon trembling aspen currant whitebark pine	3 3 3 3
Herb layer (40)	rough fescue western yarrow spike trisetum nodding onion	20 3 5 5	wild strawberry round-leaved alumroot sulphur hedysarum wild rye grass	5 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
western thimbleberry shrubby cinquefoil round-leaved alumroot prairie koeleria spike trisetum lance-leaved stonecrop wild rye grass northern goldenrod	tree layer creeping Oregon-grape Indian paintbrush pine grass heart-leaved arnica timber milk-vetch three-spot mariposa lily dwarf blueberry

TERRAIN AND SOILS

Terrain: colluvial veneer of mountain slopes

Soil Texture: silt loam to sandy loam
Soil Association Comp: BS_7, RA_2, RH_5, RN_7
Moisture regime: subxeric to xeric
Drainage: rapid

TOPOGRAPHY

Elevation: 1700-2200 m
Slope: 40-60%
Aspect: 90-225°
Landscape position: upper to middle slope

ECOLOGY

- severe moisture deficits inhibit tree establishment
- shallow soils are sensitive to disturbance
- caused by severe or repeated fires

SUCCESSION

- extremely slow rate of succession for this persistent shrub-grassland vegetation
- coniferous tree establishment is inhibited by droughty soils and competition

91 Lodgepole pine - soopolallie - pine grass - timber milk-vetch

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: young seral
Stand appearance: open to dense coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine, and Western larch - ponderosa pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (45)	lodgepole pine western larch	35 10	Rocky Mountain Douglas-fir ponderosa pine	10 5
Tall shrub layer (5)	-		Rocky Mountain Douglas-fir	5
Low shrub layer (10)	soopolallie Wood's rose	5 3	common juniper common saskatoon Rocky Mountain Douglas-fir birch-leaved spirea	3 3 3 3
Herb layer (45)	pine grass kinnikinnick wild strawberry western yarrow	30 5 3 3	rough fescue timber milk-vetch three-spot mariposa lily Richardson's needle grass	5 3 3 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
Rocky Mountain juniper timber milk-vetch three-spot mariposa lily Richardson's needle grass dwarf blueberry pine grass elegant death-camas racemose pussytoes	round-leaved alumroot

TERRAIN AND SOILS

Terrain: terrace or plain of fluvial material

Soil Texture: sandy loam
Soil Association Comp: FX$_1$, KE$_1$, MD$_5$
Moisture regime: mesic to submesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 700-1100 m
Slope: 0-30%
Aspect: various
Landscape position: middle to lower slope

ECOLOGY

- moisture deficits through much of summer months
- coarse texture of soil allows rapid drainage and low nutrient content
- some removal of lime from upper parts of the soil has taken place
- burning may increase adverse effects of high lime concentrations

SUCCESSION

- slow rate of succession due to droughty, coarse-textured soils which inhibit tree regeneration
- typical young seral vegetation on fluvial sites of these two subzones
- Successional Sequence #11, 13

92 Trembling aspen - common saskatoon - pine grass - western yarrow (see Plate 2.32)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Successional stage: young seral
Stand appearance: open broad-leaved forest

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine, Rocky Mountain Douglas-fir - lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (30)	trembling aspen	30	lodgepole pine	3
Low shrub layer (30)	trembling aspen common saskatoon birch-leaved spirea soopolallie	10 10 3 5	common juniper creeping Oregon-grape rose willows	3 3 3 3
Herb layer (15)	pine grass western yarrow	5 3	nodding onion kinnikinnick showy aster yellow penstemon	3 10 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
yellow penstemon	common snowberry	rough fescue
round-leaved alumroot	Rocky Mountain juniper	
northwestern sedge	heart-leaved arnica	
Kentucky blue grass	northern twinflower	
northern goldenrod	sulphur hedysarum	
thread-leaved sandwort	timber milk-vetch	

TERRAIN AND SOILS

Terrain: deep or shallow soils of mountain slopes; colluvial

Soil Texture: sandy loam
Soil Association Comp: CY_2, RN_7, RR_6
Moisture regime: subxeric
Drainage: rapid

TOPOGRAPHY

Elevation: 1500-1950 m
Slope: 10-80%
Aspect: 140-225°
Landscape position: middle to upper slopes

ECOLOGY

- strong exposure to sun heat
- severe moisture deficits on steep southern exposures
- base saturation of soils is relatively high
- sensitive sites where shallow soils occur

SUCCESSION

- slow rate of succession due to severe moisture deficits and because site has been degraded by repeated fires

93 Lodgepole pine - birch-leaved spirea - pine grass - hawkweed

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (40)	lodgepole pine Rocky Mountain Douglas-fir	20 15	western larch	10
Tall shrub layer (5)	-		Rocky Mountain Douglas-fir	5
Low shrub layer (15)	birch-leaved spirea soopolallie common juniper Wood's rose	5 5 3 3	common saskatoon creeping Oregon-grape willow common snowberry	3 3 3 3
Herb layer (45)	pine grass kinnikinnick wild strawberry nodding onion	35 3 3 3	western yarrow heart-leaved arnica sulphur hedysarum timber milk-vetch	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent
Rocky Mountain Douglas-fir hawkweed heart-leaved arnica northern twinflower wood strawberry sulphur hedysarum	timber milk-vetch dwarf blueberry	Rocky Mountain juniper yellow penstemon northwestern sedge

TERRAIN AND SOILS

Terrain: deep soils of mountain slopes and terraces; fluvial, morainal
Soil Texture: sandy loam to silty loam
Soil Association Comp: FX_1, KE_1, MD_1, SP_4
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 900-1550 m
Slope: 0-45%
Aspect: various
Landscape position: middle slope to valley floor

ECOLOGY

- moisture deficit through part of summer further emphasized by high lime content
- lime accumulation cause root matting and restricts rooting depths

SUCCESSION

- normal rate of succession except on droughty, coarse-textured soils where tree regeneration is inhibited
- typical seral vegetation on average sites in this subzone
- Successional Sequence #20

Plate 2.33 Group O. 94) Lodgepole pine - soopolallie - pine grass - northern twinflower. The vegetation of this site is dominated by lodgepole pine, soopolallie, dwarf blueberry, pine grass, kinnikinnick and timber milk-vetch. It is on an est-facing fluvial slope at 1200 m.

Plate 2.34 Group Q. 103) Rocky Mountain Douglas-fir - common saskatoon - antelope bush - pine grass - western yarrow. The vegetation of this site is dominated by Rocky Mountain Douglas-fir, antelope bush , arrow-leaved balsamroot, pine grass and field locoweed. It is on a west-facing fluvial slope at 950 m.

94	Lodgepole pine - soopolallie - pine grass - northern twinflower (see Plate 2.33)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook, Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (40)	lodgepole pine	40	Rocky Mountain Douglas-fir	10
Tall shrub layer (10)	Rocky Mountain Douglas-fir	5	lodgepole pine	20
Low shrub layer (35)	soopolallie	15	common saskatoon	5
	common juniper	5	Rocky Mountain Douglas-fir	3
	birch-leaved spirea	10	creeping Oregon-grape	3
	Wood's rose	5	trembling aspen	3
Herb layer (45)	pine grass	30	western yarrow	5
	kinnikinnick	10	showy aster	3
	wild strawberry	5	northern twinflower	3
			timber milk-vetch	5
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
birch-leaved spirea	shrubby cinquefoil
hawkweed	western meadow-rue
heart-leaved arnica	wood strawberry
northern twinflower	early blue violet
Pacific anemone	

TERRAIN AND SOILS

Terrain: deep soil of lower slopes and terraces; fluvial, morainal, lacustrine, colluvial
Soil Texture: silty loam to sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 950-1300 m
Slope: 0-30%
Aspect: various
Landscape position: lower slope

ECOLOGY

- moisture deficits for part of summer emphasized by high lime concentrations
- lime accumulations limit rooting depth and causes root matting

SUCCESSION

- normal rate of succession for this subzone
- typical vegetation for average to slightly drier than average sites within this subzone
- Successional Sequence #19

95	Trembling aspen - common snowberry - northern bedstraw - clover

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: All subzones

Successional stage: young to maturing seral
Stand appearance: open broad-leaved forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	trembling aspen	30	white spruce	10
Tall shrub layer (20)	trembling aspen	20	common saskatoon	10
Low shrub layer (15)	common snowberry	10	common saskatoon trembling aspen creeping Oregon-grape	10 10 3
Herb layer (10)	northern twinflower	5	pine grass western meadow-rue Kentucky blue grass clover	3 3 10 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
trembling aspen western meadow-rue	Rocky Mountain Douglas-fir common juniper birch-leaved spirea nodding onion heart-leaved arnica	sulphur hedysarum Pacific anemone northern twinflower

TERRAIN AND SOILS

Terrain: floodplain, lacustrine

Soil Texture: silt loam to sand
Soil Association Comp: M_2, MA_2, S_1, S_{10}, S_{11}
Moisture regime: subhygric to hygric
Drainage: moderately well to imperfect

TOPOGRAPHY

Elevation: 750-1150 m
Slope: 0-5%
Aspect: n/a
Landscape position: valley floor

ECOLOGY

- moisture and nutrient rich sites in valley bottom positions
  - high water table for part of the year and possibility of flooding
- watertable fluctuates widely and may cause well drained conditions during low runoff
- soils may have high base status even at the surface

SUCCESSION

- slow rate of succession due to high water table
- leading to an edaphic climax of white spruce
- typical wet valley bottom vegetation for lacustrine materials
- Successional Sequence #28

96 Ponderosa pine - Rocky Mountain Douglas-fir - common saskatoon - pine grass - rough fescue

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine, and Western larch - ponderosa pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	ponderosa pine Rocky Mountain Douglas-fir	15 20	-	
Tall shrub layer (5)	-		Rocky Mountain Douglas-fir Rocky Mountain juniper	10 10
Low shrub layer (15)	common saskatoon soopolallie	5 3	Rocky Mountain Douglas-fir antelopebush birch-leaved spirea Wood's rose	5 15 3 3
Herb layer (50)	pine grass rough fescue kinnikinnick	20 15 5	timber milk-vetch field pussytoes arrow-leaved balsamroot bluebunch wheat grass	3 3 3 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
soopolallie sulphur hedysarum spike-like goldenrod	common snowberry baldhip rose Douglas' aster small western needle grass small-flowered blue-eyed Mary

TERRAIN AND SOILS

Terrain: deep or shallow soils of lower mountain slopes and plain; morainal or colluvial veneer and blanket, fluvial
Soil Texture: sandy loam
Soil Association Comp: wide range of soils
Moisture regime: mesic to subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 800-1350 m
Slope: 0-50%
Aspect: 140-270°
Landscape position: middle slope to valley floor

ECOLOGY

- moderate to severe moisture deficits for much of the summer
- frequently on southern exposures
- generally highly calcareous soils

SUCCESSION

- normal rate of succession for these two subzones
- succession may be slowed if this type occurs on southern exposures, coarse-textured soils or shallow soils resulting in greater moisture deficiencies and higher surface temperatures
- severe disturbance creates persistent savannah vegetation
- Succession Sequences #6, 7 and 11

97 Rocky Mountain Douglas-fir - common saskatoon - bluebunch wheat grass - western yarrow

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook
Zone: Interior Rocky Mountain Douglas-fir
Subzone: All subzones

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	Rocky Mountain Douglas-fir	25	ponderosa pine	15
Tall shrub layer (0)	-		-	
Low shrub layer (15)	common saskatoon	3	Wood's rose	3
	Rocky Mountain Douglas-fir	5	ponderosa pine	3
			Rocky Mountain juniper	3
			antelopebush	10
Herb layer (30)	western yarrow	3	pine grass	5
	bluebunch wheat grass	10	timber milk-vetch	3
	rough fescue	10	yellow penstemon	3
	prairie koeleria	5	shaggy fleabane	3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
western yarrow	soopolallie
timber milk-vetch	small western needle grass
antelopebush	sulphur hedysarum
	showy aster

TERRAIN AND SOILS

Terrain: deep to shallow soils of lower mountain slope and valley floor; fluvial, colluvial, morainal
Soil Texture: sandy loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: submesic to xeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 600-1000 m
Slope: 0-35%
Aspect: 180-270°
Landscape position: middle slope to valley floor

ECOLOGY

- moderate to severe moisture deficits
- generally on south to west exposures
- high lime accumulation in soil

SUCCESSION

- slow rate of succession due to severe moisture deficits on south to west aspects and higher surface temperatures
- disturbance may create persistent savannah vegetation
- Succession Sequence #4, 10 and 17

111 Lodgepole pine - silky lupine - Richardson's needle grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: young seral
Stand appearance: coniferous parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (15)	lodgepole pine	15	-	
Tall shrub layer (0)	-		-	
Low shrub layer (5)	-		common snowberry	5
Herb layer (85)	silky lupine Richardson's needle grass	15 10	old man's whiskers bluebunch wheat grass Kentucky blue grass prairie koeleria	5 5 5 5
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
lodgepole pine common snowberry silky lupine bluebunch wheat grass common timothy	Rocky Mountain Douglas-fir common saskatoon soopolallie birch-leaved spirea dwarf blueberry heart-leaved arnica showy aster fireweed

TERRAIN AND SOILS

Terrain: fluvial terrace

Soil Texture: sandy loam
Soil Association Comp: MY_2
Moisture regime: submesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1200 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- poor water retention by soil
- possibly cleared in past and returning to natural cover
- moisture deficit most of summer
- cold air pooling

SUCCESSION

- slow rate of succession

117	Common rabbitbrush - bluebunch wheat grass - shaggy fleabane

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: pioneer seral
Stand appearance: savannah

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (5)	-		common rabbitbrush Wood's rose common saskatoon	2 2 2
Herb layer (20)	prairie koeleria	5	bluebunch wheat grass shaggy fleabane field pussytoes needle-and-thread grass	2 5 2 2
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
-	ponderosa pine Rocky Mountain Douglas-fir

TERRAIN AND SOILS

Terrain: fluvial terrace

Soil Texture: sandy loam
Soil Association Comp: FX_1
Moisture regime: xeric
Drainage: well drained

TOPOGRAPHY

Elevation: 750 m
Slope: 3%
Aspect: 270°
Landscape position: lower slope

ECOLOGY

- severe moisture deficiency, high surface temperature
- poor revegetation
- history of ground fires, and disturbance
- soils very high in lime content

SUCCESSION

- extremely slow rate of succession due to severe moisture deficits and high surface temperatures
- this is a persistent pioneer stage
- Succession Sequence #1

98	Ponderosa pine - common saskatoon - prairie koeleria

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook
Zone: Interior Rocky Mountain Douglas-fir
Subzone: Ponderosa pine

Successional stage: young to maturing seral
Stand appearance: coniferous parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (20)	ponderosa pine	20	Rocky Mountain Douglas-fir	5
Tall shrub layer (10)	ponderosa pine Rocky Mountain Douglas-fir	5 5	-	
Low shrub layer (10)	common saskatoon	5	antelopebush common snowberry soopolallie birch-leaved spirea	15 10 3 5
Herb layer (20)	prairie koeleria kinnikinnick field pussytoes wild strawberry	5 3 5 3	rough fescue three-spot mariposa lily small western needle grass western yarrow	10 3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
birch-leaved spirea	showy aster
rough fescue	Indian paintbrush
yellow penstemon	Douglas' aster
yellow salsify	
Kentucky blue grass	
spreading phlox	

TERRAIN AND SOILS

Terrain: deep soils of valley floor; fluvial, lacustrine

Soil Texture: silty clay loam to sandy loam
Soil Association Comp: E_1, E_2, FX_1, FX_2, M_2, M_4
Moisture regime: mesic to subxeric
Drainage: well

TOPOGRAPHY

Elevation: 750-950 m
Slope: 0-45%
Aspect: 180-270°
Landscape position: middle slope to valley floor

ECOLOGY

- severe moisture deficits during summer months
- highly calcareous soils
- generally southern exposures
- moderately disturbed communities

SUCCESSION

- slow rate of succession for this subzone due to droughtiness of soils and high surface temperatures
- severe disturbance may create persistent grassland vegetation
- Succession Sequences #2 and 4

99	Rocky Mountain Douglas-fir - common saskatoon - small western needle grass - western yarrow

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: All subzones

Successional stage: maturing to overmature seral
Stand appearance: coniferous parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (15)	Rocky Mountain Douglas-fir ponderosa pine	10 5	-	
Tall shrub layer (15)	ponderosa pine Rocky Mountain Douglas-fir	5 10	Rocky Mountain juniper	3
Low shrub layer (15)	common saskatoon common juniper	5 5	Rocky Mountain Douglas-fir soopolallie Rocky Mountain juniper common snowberry	3 5 5 3
Herb layer (25)	Douglas' aster kinnikinnick small western needle grass	3 5 10	western yarrow Columbia gromwell prairie crocus arrow-leaved balsamroot	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
showy aster	birch-leaved spirea
arrow-leaved balsamroot	rough fescue
Douglas' aster	spreading phlox

TERRAIN AND SOILS

Terrain: deep soils of slopes of plain in Rocky Mountain Trench; fluvial, colluvial, morainal
Soil Texture: silt loam to loamy sand
Soil Association Comp: COL_1, FX_1, MD_1
Moisture regime: mesic to subxeric
Drainage: well

TOPOGRAPHY

Elevation: 850-1200 m
Slope: 20-70%
Aspect: 110-225°
Landscape position: middle to lower slope

ECOLOGY

- severe moisture deficits for much of the summer months
- generally on steep, southern exposures
- strongly calcareous soils
- severe use in the past

SUCCESSION

- slow rate of succession for this subzone due to severe moisture deficits of southern exposures and high surface temperatures
- severe disturbance creates persistent savannah vegetation

100	Rocky Mountain Douglas-fir - common saskatoon - kinnikinnick - western yarrow

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: All subzones

Successional stage: maturing seral to climatic climax
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	Rocky Mountain Douglas-fir	25	ponderosa pine	10
Tall shrub layer (5)	Rocky Mountain Douglas-fir	5	ponderosa pine Rocky Mountain juniper	3 5
Low shrub layer (5)	common saskatoon Rocky Mountain Douglas-fir	7 3	common juniper birch-leaved spirea soopolallie antelopebush	3 5 3 10
Herb layer (35)	pine grass kinnikinnick western yarrow	15 10 3	common dandelion field pussytoes Douglas' aster rough fescue	3 3 3 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent
birch-leaved spirea soopolallie Wood's rose wood strawberry rough fescue nodding onion	kinnikinnick field pussytoes western yarrow	timber milk-vetch Kentucky blue grass

TERRAIN AND SOILS

Terrain: deep soils of lower mountain slopes of the Trench; fluvial terrace, moraine, colluvial
Soil Texture: silty loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: mesic to subxeric
Drainage: well

TOPOGRAPHY

Elevation: 800-1300 m
Slope: 0-35%
Aspect: various
Landscape position: lower slope to valley floor

ECOLOGY

- moderate to severe moisture deficits
- generally on southern exposures
- poor revegetation because of high lime and droughty conditions of the surface

SUCCESSION

- normal rate of succession for the lower two subzones while relatively slow rate of succession for the Lodgepole pine subzone
- Succession Sequence #11

101 Ponderosa pine - Rocky Mountain juniper - bluebunch wheat grass - prairie koeleria

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: maturing seral
Stand appearance: coniferous parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (15)	ponderosa pine	15	Rocky Mountain Douglas-fir	5
Tall shrub layer (15)	ponderosa pine Rocky Mountain juniper	10 3	Rocky Mountain Douglas-fir	5
Low shrub layer (5)	ponderosa pine	3	Rocky Mountain Douglas-fir common saskatoon prairie sagebrush antelopebush	3 3 3 3
Herb layer (35)	bluebunch wheat grass prairie koeleria	25 5	timber milk-vetch Holboell's rock cress yellow salsify spreading phlox	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
antelopebush	lodgepole pine	yellow penstemon
timber milk-vetch	soopolallie	old man's whiskers
Columbia gromwell	western yarrow	
prairie koeleria	pine grass	
Holboell's rock cress	wild strawberry	
yellow salsify	kinnikinnick	

TERRAIN AND SOILS

Terrain: terrace and slopes of fluvial and lacustrine materials
Soil Texture: silty clay loam or loamy sand
Soil Association Comp: Fx_1, M_2
Moisture regime: subxeric
Drainage: rapidly

TOPOGRAPHY

Elevation: 800 m
Slope: 20-60%
Aspect: 160-200°
Landscape position: middle to lower slope

ECOLOGY

- severe moisture deficits on steep southern exposures
- poor revegetation because of high lime content and drought at the surface of the soil
- moderate to light disturbance history

SUCCESSION

- slow rate of succession for this subzone due to droughty soils and high surface temperatures
- typical seral vegetation for fluvial and lacustrine materials
- severe disturbance creates persistent grasslands
- Succession Sequence #2

102 Ponderosa pine - antelopebush - bluebunch wheat grass - old man's whiskers

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook
Zone: Interior Rocky Mountain Douglas-fir
Subzone: Ponderosa pine

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (30)	ponderosa pine	30	Rocky Mountain Douglas-fir	5
Tall shrub layer (7)	ponderosa pine	7	-	
Low shrub layer (15)	antelopebush	10	common saskatoon Wood's rose ponderosa pine	3 3 3
Herb layer (25)	bluebunch wheat grass old man's whiskers western yarrow	15 3 3	field pussytoes Pacific anemone yellow salsify Kentucky blue grass	3 3 3 3

CHARACTER SPECIES

Present	Absent
Wood's rose	common juniper
western yarrow	birch-leaved spirea
pine grass	nodding onion
Pacific anemone	timber milk-vetch
old man's whiskers	rough fescue
low pussytoes	Columbia gromwell

TERRAIN AND SOILS

Terrain: deep soils of slopes in Rocky Mountain Trench; morainal, fluvial fan and terrace
Soil Texture: silty loam to sandy loam
Soil Association Comp: E_1, F_1, WY_1, WY_2
Moisture regime: subxeric to xeric
Drainage: well

TOPOGRAPHY

Elevation: 650-900 m
Slope: 0-20%
Aspect: 200-250°
Landscape position: lower slope to valley floor

ECOLOGY

- severe moisture deficits in summer months
- strongly calcareous soils
- poor revegetation
- fire and moderate use disturbance history

SUCCESSION

- slow rate of succession for this subzone because of drought and high surface temperatures
- typical seral vegetation for drier sites of this subzone
- severe disturbance creates persistent savannah vegetation
- Succession Sequence #2 and 6

103	Rocky Mountain Douglas-fir - common saskatoon - antelopebush - pine grass - western yarrow (see Plate 2.34)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: young to maturing seral
Stand appearance: open coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (35)	Rocky Mountain Douglas-fir ponderosa pine	20 20	-	
Tall shrub layer (15)	Rocky Mountain Douglas-fir ponderosa pine	10 7	-	
Low shrub layer (15)	Rocky Mountain Douglas-fir common saskatoon	5 5	antelopebush birch-leaved spirea ponderosa pine	15 3 3
Herb layer (40)	pine grass western yarrow kinnikinnick three-spot mariposa lily	20 3 5 3	rough fescue timber milk-vetch bluebunch wheat grass prairie koeleria	10 5 10 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
nodding onion timber milk-vetch rough fescue Columbia gromwell prairie koeleria Nuttall's pussytoes	-

TERRAIN AND SOILS

Terrain: deep soils in valley floor of Rocky Mountain Trench; morainal, fluvial, colluvial blanket and veneer
Soil Texture: silty clay loam to loamy sand
Soil Association Comp: wide range of soils
Moisture regime: mesic to subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 750-1000 m
Slope: 0-40%
Aspect: various
Landscape position: middle slope to valley floor

ECOLOGY

- severe moisture deficiencies in the summer months
- poor revegetation because of high lime and surface drought

SUCCESSION

- normal rate of succession for this subzone
- typical mature vegetation of average sites of this subzone
- succession is initially slow then faster due to self-induced site moderation (shading, cooling)
- Succession Sequence #7

135	Rocky Mountain maple - oceanspray - bluebunch wheat grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir zone

Subzone: All subzones

Successional stage: pioneer seral
Stand appearance: pioneer shrub

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (5)	-		Rocky Mountain Douglas-fir ponderosa pine	15 5
Tall shrub layer (25)	Rocky Mountain maple common saskatoon	15 15	choke cherry	10
Low shrub layer (30)	choke cherry common saskatoon oceanspray Lewis' mock-orange	10 15 10 10	mallow ninebark redstem ceanothus snowbush ceanothus antelopebush	10 10 10 10
Herb layer (30)	bluebunch wheat grass spreading dogbane nodding onion	15 10	blue grass arrow-leaved balsamroot	10 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
choke cherry redstem ceanothus oceanspray spreading dogbane	pine grass lodgepole pine Idaho fescue

TERRAIN AND SOILS

Terrain: lower slopes of colluvial blankets

Soil Texture: rubbly sandy loam
Soil Association Comp: CG_7
Moisture regime: subxeric
Drainage: rapid

TOPOGRAPHY

Elevation: 800-1100 m
Slope: 40-70%
Aspect: 170-270°
Landscape position: lower to middle slope

ECOLOGY

- the sites associated with this vegetation generally are steep, south to west facing slopes
- the soil surface is generally unstable and has a high percentage of coarse fragments on the surface
- the vegetation is valuable to prevent erosion on these fragile sites

SUCCESSION

- very slow rate of succession due to extreme moisture deficits
- severe disturbance creates a persistent shrub community

104	Small western needle grass - few-flowered shooting star - three-spot mariposa lily

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: maturing edaphic climax
Stand appearance: steppe

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (0)	-		-	
Herb layer (45)	small western needle grass	40	few-flowered shooting star desert parsley old man's whiskers brown-haired orange-flowered arnica	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
rosy pussytoes desert parsley	Rocky Mountain Douglas-fir ponderosa pine common saskatoon Wood's rose common snowberry prairie koeleria	bluebunch wheat grass

TERRAIN AND SOILS

Terrain: fluvial terrace

Soil Texture: sandy loam to loamy sand
Soil Association Comp: KE_1
Moisture regime: xeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 900 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- severe moisture deficit due to rapid drainage, high evapotranspiration and high surface temperatures
- repeatedly burned in the past
- poor revegetation because of above conditions and high lime content of the soil

SUCCESSION

- extremely slow rate of succession due to severe moisture deficits, and high surface temperatures, lethal for tree germinants

Plate 2.35 Group R. 105) Needle-and-thread grass - drooping brome grass - low pussytoes. The vegetation of this site is dominated by needle-and-thread grass, shaggy fleabane and pussytoes on a fluvial terrace at 800 m.

Plate 2.36 Group R. 108) Rocky Mountain Douglas-fir - common snowberry - arrow-leaved balsamroot - bluebunch wheatgrass. The vegetation of this site is dominated by Rocky Mountain Douglas-fir, arrow-leaved balsamroot, bluebunch wheatgrass and drooping brome grass. It is found on a west-facing morainal slope at 800 m.

105	Needle-and-thread grass - drooping brome grass - low pussytoes (see Plate 2.35)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: maturing edaphic climax
Stand appearance: steppe

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (3)	-		common snowberry	3
Herb layer (50)	needle-and-thread grass drooping brome	20 20	three-spot mariposa lily yellow salsify low pussytoes prairie koeleria	3 3 7 5
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
small-flowered blue-eyed Mary	ponderosa pine	bluebunch wheat grass
drooping brome grass	Rocky Mountain Douglas-fir	kinnikinnick
low pussytoes	common saskatoon	timber milk-vetch
shaggy fleabane	common juniper	
narrow-leaved lomatium	Rocky Mountain juniper	
old man's whiskers	pine grass	

TERRAIN AND SOILS

Terrain: morainal, fluvial terrace

Soil Texture: sandy loam to silt loam
Soil Association Comp: P_{10}, SA_{10}
Moisture regime: xeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 800-850 m
Slope: 0-20%
Aspect: level or 270°
Landscape position: lower slope to valley floor

ECOLOGY

- severe moisture deficiencies due to high evapotranspiration low precipitation and rapid drainage, and high lime content of soil
- poor revegetation

SUCCESSION

- extremely slow rate of succession due to severe moisture deficits and high surface temperatures

106	Rocky Mountain Douglas-fir - Rocky Mountain juniper - kinnikinnick - Pacific anemone

VEGETATION CHARACTERISTICS
Region: Dry Interior
Section: Radium, Cranbrook

Successional stage: maturing or young seral
Stand appearance: coniferous parkland

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (10)	Rocky Mountain Douglas-fir	10	lodgepole pine	10
Tall shrub layer (10)	Rocky Mountain Douglas-fir Rocky Mountain juniper	10 3	-	
Low shrub layer (20)	Rocky Mountain Douglas-fir common juniper common saskatoon Rocky Mountain juniper	5 5 5 3	Wood's rose soopolallie common snowberry	5 3 5
Herb layer (25)	kinnikinnick wild strawberry hairy golden-aster Pacific anemone	10 5 3 3	western yarrow Columbia gromwell bluebunch wheat grass Idaho fescue	5 3 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent
Rocky Mountain Douglas-fir Rocky Mountain juniper soopolallie kinnikinnick pine grass Pacific anemone	short-beaked false dandelion	ponderosa pine antelopebush narrow-leaved lomatium shaggy fleabane

TERRAIN AND SOILS

Terrain: deep soils of Rocky Mountain Trench; lacustrine, morainal, fluvial
Soil Texture: silty to silty loam
Soil Association Comp: KE_1, M_1, MD_1
Moisture regime: mesic to subxeric
Drainage: well

TOPOGRAPHY

Elevation: 850-900 m
Slope: 3-15%
Aspect: various
Landscape position: lower slope

ECOLOGY

- moisture deficiencies through much of growing season
- strongly calcareous soils

SUCCESSION

- slow rate of succession for this subzone
- Succession Sequence #18

107 Shaggy fleabane - prairie koeleria - needle-and-thread grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook
Zone: Interior Rocky Mountain Douglas-fir
Subzone: Ponderosa pine
Successional stage: pioneer seral
Stand appearance: steppe

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (0)	-		-	
Herb layer (60)	shaggy fleabane	40	nodding onion	3
	needle-and-thread grass	30	brown-eyed Susan	3
	prairie koeleria	20	woolly plantain	3
			rough fescue	3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent	
shaggy fleabane	Columbia brome grass	ponderosa pine	drooping brome grass
needle-and-thread grass		Rocky Mountain Douglas-fir	
brown-eyed Susan		common saskatoon	
nodding onion		timber milk-vetch	
small western needle grass		Columbia gromwell	
spreading phlox		three-spot mariposa lily	

TERRAIN AND SOILS

Terrain: fluvial terrace of Rocky Mountain Trench

Soil Texture: sandy loam to loamy sand
Soil Association Comp: E_1, SA_{10}
Moisture regime: xeric
Drainage: rapid

TOPOGRAPHY

Elevation: 750-900 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- severe moisture deficits
- sites have been subjected to ground fires
- poor revegetation
- highly calcareous soils

SUCCESSION

- extremely slow rate of succession due to severe moisture deficits and high surface temperatures preventing tree regeneration
- Succession Sequence #1 and 8

108	Rocky Mountain Douglas-fir - common snowberry - arrow-leaved balsamroot - bluebunch wheat grass (see Plate 2.36)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: maturing to overmature seral
Stand appearance: coniferous parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (15)	Rocky Mountain Douglas-fir	15	ponderosa pine	5
Tall shrub layer (5)	Rocky Mountain Douglas-fir	5	-	
Low shrub layer (15)	common snowberry common saskatoon	10 3	Rocky Mountain Douglas-fir antelopebush choke cherry ponderosa pine	3 7 3 3
Herb layer (60)	arrow-leaved balsamroot bluebunch wheat grass	30 20	drooping brome grass slender hawk's-beard narrow-leaved lomatium prairie koeleria	10 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent	
Rocky Mountain Douglas-fir ponderosa pine choke cherry common saskatoon common snowberry arrow-leaved balsamroot	drooping brome grass slender hawk's-beard	lodgepole pine common juniper Wood's rose western yarrow Holboell's rock cress Pacific anemone	old man's whiskers

TERRAIN AND SOILS

Terrain: deep soil of slopes in Rocky Mountain Trench; morainal, fluvial
Soil Texture: sandy loam
Soil Association Comp: FX_1, WY_1
Moisture regime: subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 800-1000 m
Slope: 35-55%
Aspect: 250-270°
Landscape position: middle slope

ECOLOGY

- on dry western exposures
- severe moisture deficits
- poor revegetation
- highly calcareous soils

SUCCESSION

- slow rate of succession for this subzone due to droughty soils of steep southern exposures
- typical vegetation on steep south to west facing slopes of this subzone
- Succession Sequence #5 and 10

Plate 2.37 Group R. 109) Ponderosa pine - common saskatoon - rough fescue - spreading phlox. The vegetation of this site is dominated by ponderosa pine, blue grass, timber milk-vetch and various other herbs and grasses. It is on a level morainal blanket at 900 m.

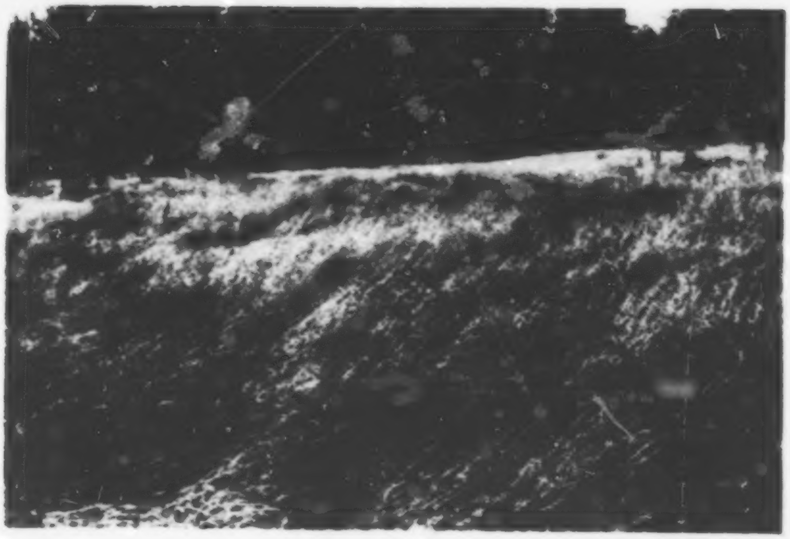


Plate 2.38 Group S. 122) Rush - common silverweed - bulrush. This vegetation is associated with very poorly drained, organic soils. It is found at 850 m.

109 Ponderosa pine - Wood's rose - prairie koeleria - northern bedstraw (see Plate 2.37)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: All subzones

Successional stage: maturing seral
Stand appearance: parkland coniferous forest

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (10)	ponderosa pine Rocky Mountain Douglas-fir	7 3	-	
Tall shrub layer (10)	Rocky Mountain Douglas-fir ponderosa pine	7 3	-	
Low shrub layer (15)	Wood's rose Rocky Mountain Douglas-fir common snowberry ponderosa pine	3 3 3 3	antelopebush common saskatoon common juniper	3 3 3
Herb layer (25)	prairie koeleria three-spot mariposa lily Nuttall's pussytoes yellow salsify	7 3 5 3	timber milk-vetch bluebunch wheat grass northern bedstraw old man's whiskers	5 10 5 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present

common juniper
northern bedstraw
hawkweed
western yarrow
wild strawberry
Holboell's rock cress
Pacific anemone

Absent

lodgepole pine
soopolallie
choke cherry
kinnikinnick
arrow-leaved balsamroot
prairie crocus
rosy pussytoes
dusky brown pussytoes

TERRAIN AND SOILS

Terrain: morainal blanket, lacustrine

Soil Texture: silt loam
Soil Association Comp: M_1, P_1, WY_1
Moisture regime: subxeric
Drainage: well

TOPOGRAPHY

Elevation: 800-900 m
Slope: 0-40%
Aspect: 100-280°
Landscape position: middle slope to valley floor

ECOLOGY

- moisture deficits much of summer
- strongly calcareous soils
- disturbance history

SUCCESSION

- slow rate of succession due to severe moisture deficits
- Succession Sequence #6 and 10

110 Ponderosa pine - common saskatoon - rough fescue - spreading phlox

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

Successional stage: young to maturing seral
Stand appearance: coniferous parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (15)	ponderosa pine Rocky Mountain Douglas-fir	10 5	-	
Tall shrub layer (15)	Rocky Mountain juniper ponderosa pine	5 10	Rocky Mountain Douglas-fir	5
Low shrub layer (15)	common saskatoon common juniper Wood's rose	5 3 3	Rocky Mountain juniper antelopebush choke cherry prairie sagebrush	10 3 3 3
Herb layer (30)	rough fescue prairie koeleria kinnikinnick timber milk-vetch	7 10 3 5	bluebunch wheat grass western yarrow dusky brown pussytoes nodding onion	15 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present		Absent
soopolallie kinnikinnick wild rye grass prairie crocus small western needle grass star-flowered false Solomon's-seal	dusky brown pussytoes	Nuttall's pussytoes

TERRAIN AND SOILS

Terrain: fluvial terraces and slopes of Rocky Mountain Trench
Soil Texture: fine
Soil Association Comp: E_1, F_1
Moisture regime: subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 750-900 m
Slope: 3-60%
Aspect: 160-240°
Landscape position: lower slope

ECOLOGY

- moisture deficit through much of summer, rapid drainage
- poor revegetation
- high lime content of soil

SUCCESSION

- slow rate of succession for this subzone
- severe disturbance creates persistent grassland communities
- Succession Sequence #2

118	Rocky Mountain juniper - bluebunch wheat grass - arrow-leaved balsamroot

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: pioneer seral
Stand appearance: savannah

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (3)	-		Rocky Mountain juniper prairie sagebrush	3 3
Herb layer (75)	bluebunch wheat grass	60	arrow-leaved balsamroot prairie koeleria rough fescue shaggy fleabane	2 2 2 2
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
Rocky Mountain juniper bluebunch wheat grass arrow-leaved balsamroot shaggy fleabane	ponderosa pine Rocky Mountain Douglas-fir antelopebush soopolallie birch-leaved spirea pine grass	yellow penstemon timber milk-vetch

TERRAIN AND SOILS

Terrain: deep fluvial

Soil Texture: sandy loam
Soil Association Comp: RB_5
Moisture regime: xeric
Drainage: rapid

TOPOGRAPHY

Elevation: 900 m
Slope: 65%
Aspect: 225°
Landscape position: lower slope

ECOLOGY

- severe moisture deficit on steep southwest exposure
- poor revegetation
- history of ground fires

SUCCESSION

- extremely slow rate of succession due to severe moisture deficits and high surface temperatures
- persistent pioneer seral vegetation

119	Rocky Mountain Douglas-fir - common saskatoon - bluebunch wheat grass - Nuttall's pussytoes

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: maturing seral
Stand appearance: coniferous parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (5)	-		Rocky Mountain Douglas-fir	5
Tall shrub layer (0)	-		-	
Low shrub layer (5)	-		common saskatoon prairie sagebrush Rocky Mountain Douglas-fir	5 2 2
Herb layer (60)	bluebunch wheat grass Nuttall's pussytoes	15 20	prairie koeleria Kentucky blue grass shaggy fleabane hairy golden-aster	5 2 2 2
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
Rocky Mountain Douglas-fir	ponderosa pine
common saskatoon	common snowberry
hairy golden-aster	antelopebush
brown-eyed Susan	hawkweed
Kentucky blue grass	slender hawk's-beard
three-spot mariposa lily	narrow-leaved lomatium

TERRAIN AND SOILS

Terrain: morainal blanket

Soil Texture: silt loam
Soil Association Comp: MD_1
Moisture regime: subxeric
Drainage: well

TOPOGRAPHY

Elevation: 900 m
Slope: 3%
Aspect: 140°
Landscape position: lower slope

ECOLOGY

- severe moisture deficits
- poor revegetation
- fire and use disturbance history
- soils high in lime content

SUCCESSION

- extremely slow rate of succession for this subzone due to dry climate
- Succession Sequence #14

120	Ponderosa pine - common rabbitbrush - prairie koeleria - inland blue grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: maturing seral
Stand appearance: coniferous parkland

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Ponderosa pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (5)	ponderosa pine	5	-	
Tall shrub layer (0)	-		-	
Low shrub layer (25)	common rabbitbrush	20	ponderosa pine common saskatoon common snowberry Wood's rose	2 2 2 2
Herb layer (50)	inland blue grass prairie koeleria	15 10	small western needle grass shaggy fleabane dusky brown pussytoes hairy golden-aster	2 2 2 5
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent	
common rabbitbrush	Rocky Mountain Douglas-fir	slender hawk's-beard
death-camas	Wood's rose	
dusky brown pussytoes	arrow-leaved balsamroot	
	bluebunch wheat grass	
	Holboell's rock cress	
	old man's whiskers	

TERRAIN AND SOILS

Terrain: lacustrine slope in Rocky Mountain Trench

Soil Texture: silty clay loam
Soil Association Comp: M_2
Moisture regime: xeric
Drainage: well

TOPOGRAPHY

Elevation: 850 m
Slope: 15%
Aspect: 235°
Landscape position: lower slope

ECOLOGY

- severe moisture deficits
- high surface temperatures
- poor revegetation
- strongly calcareous soils
- disturbance history

SUCCESSION

- extremely slow rate of succession
- persistent parkland community
- Succession Sequence #3

136	Common saskatoon - Idaho fescue - bluebunch wheat grass

VEGETATION CHARACTERISTICS
Region: Dry Interior
Section: Cranbrook
Zone: Interior Rocky Mountain Douglas-fir zone
Subzone: All subzones

Successional stage: pioneer seral
Stand appearance: savannah

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (10)	-		Rocky Mountain Douglas-fir	10
Tall shrub layer (0)	-		-	
Low shrub layer (20)	common saskatoon soopolallie	10 5	redstem ceanothus	10
Herb layer (90)	Idaho fescue blue grass bluebunch wheat grass	60 20 10	timber milk-vetch common harebell pine grass three-spot mariposa lily	10 10 10 7
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
Idaho fescue blue grass	antelopebush

TERRAIN AND SOILS

Terrain: low hills of shallow soils over bedrock

Soil Texture: sandy loam
Soil Association Comp: RB$_5$
Moisture regime: subxeric
Drainage: well to rapid

TOPOGRAPHY

Elevation: 1100 m
Slope: 20%
Aspect: 135-270°
Landscape position: upper slope

ECOLOGY

- shallow soils create severe moisture deficiencies during the summer
- vegetative cover is necessary to prevent erosion
- high wildlife values

SUCCESSION

- the rate of succession is very slow due to severe moisture deficits
- persistent savannah community

137	Soopolallie - blue grass - western needle grass

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Successional stage: pioneer seral
Stand appearance: savannah

Zone: Interior Rocky Mountain Douglas-fir zone

Subzone: all subzones

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (15)	-		Rocky Mountain Douglas-fir ponderosa pine	10 10
Tall shrub layer (0)	-		-	
Low shrub layer (30)	soopolallie rose	15 10	redstem ceanothus common snowberry birch-leaved spirea common saskatoon	10 5 10 10
Herb layer (75)	blue grass western needle grass common harebell	40 20 10	yellow penstemon Idaho fescue pine grass	10 10 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
blue grass western needle grass	heart-leaved arnica

TERRAIN AND SOILS

Terrain: lower terraces; fluvial

Soil Texture: sandy loam
Soil Association Comp: KE_2
Moisture regime: submesic
Drainage: well

TOPOGRAPHY

Elevation: 1000 m
Slope: level
Aspect: level
Landscape position: lower slope

ECOLOGY

- generally terraces with relatively good moisture regime although moisture deficits occur in summer
- high wildlife values

SUCCESSION

- slow rate of succession
- persistent savannah community

138	Common saskatoon - willow - pine grass - American vetch

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: all subzones

Successional stage: pioneer seral
Stand appearance: savannah

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (25)	willow common saskatoon	15 15	Rocky Mountain maple	5
Low shrub layer (20)	soopolallie	15	redstem ceanothus common snowberry	10 5
Herb layer (70)	pine grass common timothy American vetch	40 10 20	blue grass showy aster	5 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
willow redstem ceanothus pine grass common timothy	bluebunch wheat grass Idaho fescue

TERRAIN AND SOILS

Terrain: terraces of fluvial material

Soil Texture: sandy loam
Soil Association Comp: KE_2
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 1000 m
Slope: 15%
Aspect: 270°
Landscape position: lower slope

ECOLOGY

- relatively good moisture availability for terraces due to receiving positions
- severe moisture deficit in summer

SUCCESSION

- slow rate of succession
- persistent savannah community caused because of slow recovery from clearing

122	Rush - common silverweed - bulrush (see Plate 2.38)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Cranbrook

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Western larch - ponderosa pine

Successional stage: maturing edaphic climax
Stand appearance: wetland: marsh

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (0)	-		-	
Herb layer (95)	rush common silverweed	85 15	bulrush dwarf spike-rush sedge	5 3 3
Moss, lichen and liverwort layer (5)	-		-	

CHARACTER SPECIES

Present	Absent
rush bulrush common silverweed	trees willow glandular birch common timothy

TERRAIN AND SOILS

Terrain: organic

Soil Texture: fibric
Soil Association Comp: OL_1
Moisture regime: hygric
Drainage: very poor

TOPOGRAPHY

Elevation: 850 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- high water table, water from downslope movement from adjacent slopes
- mineral rich water, high alkaline content
- slow decomposition of material creates deposition of plant material
- fairly sensitive to use

SUCCESSION

- edaphic climax community

Plate 2.39 Group S. 123) Common silverweed - sedge - moss. This vegetation is associated with beach sands on the shore of ponds. It is found at 1200 m.

Plate 2.40 Group S. 124) Common silverweed - common timothy - creek goldenrod. The vegetation of this site is dominated by common silverweed, common timothy, bluegrass and creek goldenrod. It is on a level lacustrine deposit at 1200 m.

123	Common silverweed - sedge - moss (see Plate 2.39)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium
Zone: Interior Rocky Mountain Douglas-fir
Subzone: Lodgepole pine
Successional stage: edaphic climax
Stand appearance: meadow

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (0)	-		-	
Herb layer (60)	common silverweed	50	sedges rush field mint	10 3 3
Moss, lichen and liverwort layer (20)	-		various species	

CHARACTER SPECIES

Present	Absent
common silverweed sedge	trees willow common timothy pine grass

TERRAIN AND SOILS

Terrain: fluvial

Soil Texture: silt loam
Soil Association Comp: MA_{10}
Moisture regime: subhygric
Drainage: imperfectly

TOPOGRAPHY

Elevation: 1200 m
Slope: 5%
Aspect: 330°
Landscape position: valley floor

ECOLOGY

- high water table part of the year
- shoreline vegetation on beach sand
- highly alkaline soils

SUCCESSION

- edaphic climax community

124	Common silverweed - common timothy - creek goldenrod (see Plate 2.40)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: edaphic climax
Stand appearance: meadow

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (0)	-		-	
Herb layer (90)	common silverweed common timothy creek goldenrod inland blue grass	50 20 10 10	thistle Indian paintbrush common harebell western yarrow	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
common silverweed common timothy	trees shrubs sedges rushes pine grass

TERRAIN AND SOILS

Terrain: fluvial

Soil Texture: silt
Soil Association Comp: MA_{10}
Moisture regime: hygric
Drainage: imperfectly

TOPOGRAPHY

Elevation: 1200 m
Slope: 5%
Aspect: 350°
Landscape position: valley floor

ECOLOGY

- high water table much of year
- calcareous soil
- sensitive to use

SUCCESSION

- edaphic climax community

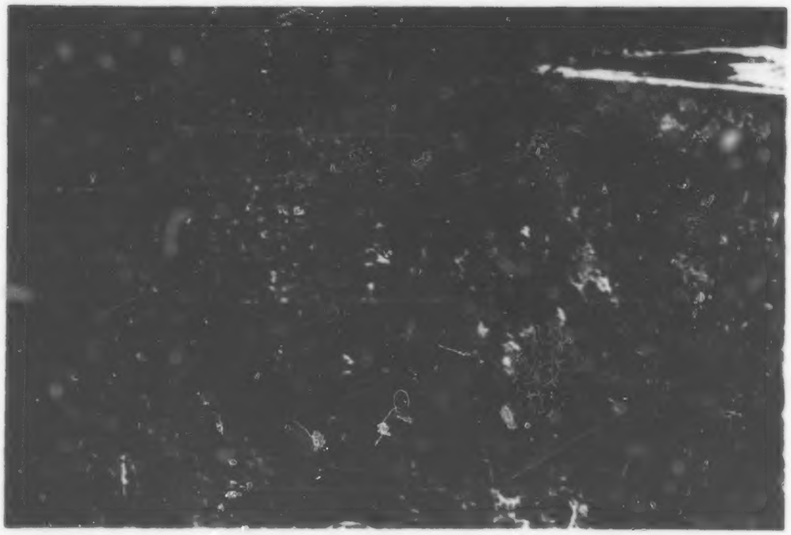


Plate 2.41 Group S. 125) Western birch - creek goldenrod. The vegetation of this site is dominated by western birch, creek goldenrod and smooth aster. It is on a floodplain at 1200 m.

Plate 2.42 Group S. 127) Willow - sedge. The vegetation of this site is dominated by willow, glandular birch and sedges, and is found on poorly drained, organic soils. It is on a depressional area at 1000 m.

125 Western birch - creek goldenrod (see Plate 2.41)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Interior Rocky Mountain Douglas-fir

Subzone: Lodgepole pine

Successional stage: pioneer seral
Stand appearance: pioneer shrub

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (20)	western birch	10	soopolallie shrubby cinquefoil willow	3 5 3
Herb layer (60)	creek goldenrod	30	smooth aster star-flowered false Solomon's-seal common timothy thistle	5 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
western birch	Rocky Mountain Douglas-fir
shrubby cinquefoil	birch-leaved spirea
creek goldenrod	western red-osier dogwood
hooded ladies'-tresses	pine grass
horsetail	sedge
	sweet-scented bedstraw

TERRAIN AND SOILS

Terrain: floodplain

Soil Texture: sandy loam
Soil Association Comp: FF_1
Moisture regime: subhygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 1200 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- subject to frequent flooding which prevents tree establishment
- rapid drainage when water table is down
- cold air pooling
- slow revegetation may leave site vulnerable for soil erosion

SUCCESSION

- slow rate of succession due to variable site conditions that include spring flooding to drought in summer

126 Willow - yellow mountain-avens

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Successional stage: pioneer seral
Stand appearance: pioneer shrub

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (30)	willow	15	black cottonwood Engelmann spruce shrubby cinquefoil soopolallie	5 5 5 3
Herb layer (70)	yellow mountain-avens	65	wild rye grass arrow-leaved ragwort thistle wild strawberry	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
shrubby cinquefoil willow yellow mountain-avens	trees western birch western red-osier dogwood pine grass sweet-scented bedstraw star-flowered false Solomon's-seal

TERRAIN AND SOILS

Terrain: floodplain

Soil Texture: sandy
Soil Association Comp: FW$_2$
Moisture regime: subhygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 1450 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- subject to frequent flooding
- cold air drainage
- poor nutrient availability since coarse, recent deposits have not weathered
- rapid drainage when water table is low

SUCCESSION

- slow rate of succession due to spring flooding and moisture deficiencies in summer and low nutrient status of materials

127	Willow - sedge (see Plate 2.42)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Interior Rocky Mountain Douglas-fir, and Subalpine Engelmann spruce - alpine fir
Subzone: Various subzones

Successional stage: maturing edaphic climax
Stand appearance: wetlands: fen

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (40)	willow	20	glandular birch shrubby cinquefoil	10 10
Herb layer (80)	sedges	70	horsetail Douglas' aster rushes	5 10 5
Moss, lichen and liverwort layer (15)	-		bracytheciums mniums	20 5

CHARACTER SPECIES

Present	Absent
willow	trees
glandular birch	soopolallie
shrubby cinquefoil	smooth Pacific menziesia
sedges	common saskatoon
	pine grass
	common silverweed
	bulrush

TERRAIN AND SOILS

Terrain: organic, fluvial level, depressional areas

Soil Texture: fibric, silty clay loam
Soil Association Comp: FV_1, FV_{11}, OO_1, OS_1
Moisture regime: hydric to subhydric
Drainage: very poor to imperfect

TOPOGRAPHY

Elevation: 1000-2000 m
Slope: level
Aspect: level
Landscape position: lower slope to valley floor

ECOLOGY

- high water table, mineral rich water from downslope movement from adjacent slopes
- various vegetation composition
- deposition of organic material as decomposition is relatively slow in oxygen poor medium

SUCCESSION

- edaphic climax community
- typical fen community for much of study area

128	Sitka mountain alder - western spring beauty - yellow glacier lily

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium, Cranbrook

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

Successional stage: maturing edaphic climax
Stand appearance: pioneer shrub

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (90)	Sitka mountain alder Sitka mountain-ash Rocky Mountain maple	25 25 15	western yew Utah honeysuckle devil's-club western thimbleberry	5 10 3 3
Herb layer (80)	western spring beauty yellow glacier lily	25 20	western meadow-rue green false hellebore common cow-parsnip Hooker's fairybells	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
Sitka mountain alder yellow glacier lily common cow-parsnip green false hellebore	alpine fir Engelmann spruce smooth Pacific menziesia pine grass

TERRAIN AND SOILS

Terrain: colluvial blanket

Soil Texture: sandy loam
Soil Association Comp: CY$_8$
Moisture regime: hygric
Drainage: imperfectly

TOPOGRAPHY

Elevation: 1500 m
Slope: 45%
Aspect: 45°
Landscape position: middle slope

ECOLOGY

- avalanches, herb and shrub competition and excessive moisture inhibit trees from establishing
- moist and nutrient rich sites
- cold air drainage

SUCCESSION

- edaphic climax community

129	Richardson's crane's-bill - western meadow-rue - common cow-parsnip

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Successional stage: maturing edaphic climax
Stand appearance: meadow

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (10)	-		twinberry honeysuckle black swamp gooseberry common juniper	5 3 3
Herb layer (95)	Richardson's crane's-bill	15	arrow-leaved ragwort false bugbane common cow-parsnip western meadow-rue	5 5 5 10
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
common juniper	trees
twinberry honeysuckle	Sitka mountain alder
black swamp gooseberry	smooth Pacific menziesia
Richardson's crane's-bill	grouseberry
common cow-parsnip	green false hellebore

TERRAIN AND SOILS

Terrain: colluvial blanket

Soil Texture: silt loam
Soil Association Comp: CM_g
Moisture regime: hygric
Drainage: imperfect

TOPOGRAPHY

Elevation: 2000 m
Slope: 55%
Aspect: 110°
Landscape position: lower slope

ECOLOGY

- avalanches, seepage and dense herb cover prevents establishment of trees
- rich moisture and nutrient sites
- cold air drainage

SUCCESSION

- edaphic climax community

Plate 2.43 Group S. 130) Broad-leaved willowherb - Lyall's phacelia - blue grass. This vegetation is found in the Alpine tundra zone on coarse-textured colluvial soils. It is on a west-facing colluvial slope at 2400 m.

Plate 2.44 Group S. 131) Diamond willow - sedge - wild strawberry. This vegetation is found in areas of long snow duration, at high elevations. It is on a level fluvial deposit at 1850 m. (Photo by D.A. Demarchi)

130	Broad-leaved willowherb - Lyall's phacelia - blue grass (see Plate 2.43)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Zone: Alpine tundra

Subzone: -

Successional stage: climatic climax
Stand appearance: alpine tundra

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (3)	-		willows	3
Herb layer (45)	broad-leaved willowherb blue grass Lyall's phacelia	15 10 7	blue-leaved cinquefoil alpine timothy spike trisetum western pasqueflower	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
willow broad-leaved willowherb Lyall's phacelia	trees shrubby cinquefoil grouseberry mountain-heather subalpine fleabane arrow-leaved ragwort

TERRAIN AND SOILS

Terrain: rubbly colluvial blanket

Soil Texture: loamy sand
Soil Association Comp: COY_7
Moisture regime: submesic
Drainage: rapid

TOPOGRAPHY

Elevation: 2400 m
Slope: 20%
Aspect: 260°
Landscape position: upper slope

ECOLOGY

- harsh climatic conditions prevent the establishment of trees
- coarse textured soil prevents nutrient and moisture retention
- sensitive to use
- long snow duration

SUCCESSION

- climax community for drier alpine sites
- slow to return after disturbance due to harsh conditions

131	Diamond willow - sedge - wild strawberry (see Plate 2.44)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Successional stage: edaphic climax
Stand appearance: wetland: shrub cover

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine subzone

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (45)	diamond willow	45	shrubby cinquefoil	3
Herb layer (80)	sedge wild strawberry wheat grass	50 30 10	fireweed arrow-leaved ragwort spike trisetum mountain vahlodea	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
diamond willow	trees
shrubby cinquefoil	glandular birch
sedge	twinberry honeysuckle
spike trisetum	subalpine fleabane
mountain vahlodea	western anemone
blue-leaved cinquefoil	

TERRAIN AND SOILS

Terrain: fluvial level

Soil Texture: sandy loam
Soil Association Comp: FV_1
Moisture regime: hygric
Drainage: imperfectly

TOPOGRAPHY

Elevation: 1850 m
Slope: level
Aspect: level
Landscape position: valley floor

ECOLOGY

- high water table much of year
- long snow duration as this area receives cold air drainage

SUCCESSION

- edaphic climax community

Plate 2.45 Group S. 132) Arrow-leaved ragwort - western pasqueflower - alpine timothy. The vegetation of this site is dominated by subalpine fleabane, yellow glacier lily, grouseberry, Indian paintbrush, blue grass, creeping sibbaldia and moss. It is on a southwest-facing morainal slope at 2000 m.

Plate 2.46 Group S. 133) Mountain-heather - grouseberry - woolly pussytoes. The vegetation of this site is dominated by alpine larch, cream mountain-heather, grouseberry and woolly pussytoes. It is on a colluvial ridge at 2300 m.

132 Arrow-leaved ragwort - western pasqueflower - alpine timothy (see Plate 2.45)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Successional stage: edaphic climax
Stand appearance: subalpine meadow

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Lodgepole pine - whitebark pine

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (0)	-		-	
Low shrub layer (3)	-		alpine larch	3
Herb layer (90)	western pasqueflower alpine timothy arrow-leaved ragwort	10 10 7	sedges grouseberry alpine blue grass	10 10 7
Moss, lichen and liverwort layer (10)	-		-	

CHARACTER SPECIES

Present	Absent
alpine larch	willow
arrow-leaved ragwort	common cow-parsnip
western pasqueflower	green false hellebore
alpine timothy	
sedges	

TERRAIN AND SOILS

Terrain: deep soils of cirques and high mountain valleys; morainal, colluvial, fluvial
Soil Texture: silty clay loam to loamy sand
Soil Association Comp: CM$_7$, GL$_2$, MC$_7$, MP$_8$, MR$_4$
Moisture regime: hygric
Drainage: moderately well

TOPOGRAPHY

Elevation: 1900-2300 m
Slope: 3-30%
Aspect: various
Landscape position: valley floor

ECOLOGY

- excessive soil moisture for part of year generally from snowmelt
- long snow duration, deep snow accumulation

SUCCESSION

- edaphic climax community
- fairly rapid recovery of similar vegetation after disturbance

133 Mountain-heather - grouseberry - woolly pussytoes (see Plate 2.46)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium
Zone: Subalpine Engelmann spruce - alpine fir

Successional stage: maturing climatic climax
Subzone: Krummholz
Stand appearance: krummholz, parkland

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (20)	-		alpine larch alpine fir	20 5
Low shrub layer (10)	-		alpine fir	10
Herb layer (90)	woolly pussytoes grouseberry alpine blue grass	20 30 10	cream mountain-heather red mountain-heather subalpine fleabane western pasqueflower	30 20 7 5
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
red mountain-heather cream mountain-heather	willow shrubby cinquefoil smooth Pacific menziesia

TERRAIN AND SOILS

Terrain: colluvial veneer and blanket, morainal

Soil Texture: silty clay loam to sandy loam
Soil Association Comp: COY$_2$, MP$_2$, MR$_4$, RA$_8$
Moisture regime: mesic
Drainage: well to rapid

TOPOGRAPHY

Elevation: 2150-2350 m
Slope: 5-35%
Aspect: 130-270°
Landscape position: upper slope

ECOLOGY

- harsh environmental conditions restrict tree growth
- slow cycling of nutrients due to cool temperatures and low biotic activity of soil organisms
- long snow duration, deep accumulation

SUCCESSION

- normal rate of succession for this subzone although succession is relatively slow in this subzone because of harsh climatic conditions
- Succession Sequence #54

Plate 2.47 Group S. 134) Alpine fir - grouseberry - mountain-heather. The vegetation of this site is dominated by alpine fir, grouseberry and cream mountain-heather. It is on a southwest-facing colluvial slope at 2300 m.

134	Alpine fir - grouseberry - cream mountain-heather (see Plate 2.47)

VEGETATION CHARACTERISTICS

Region: Dry Interior
Section: Radium

Successional stage: maturing climatic climax
Stand appearance: krummholz

Zone: Subalpine Engelmann spruce - alpine fir

Subzone: Krummholz

SPECIES COMPOSITION

Layer (% crown cover)	Dominants	% crown cover	Associates	% crown cover
Tree layer (0)	-		-	
Tall shrub layer (20)	alpine fir	20	alpine larch	3
Low shrub layer (30)	alpine fir	30	willow	3
Herb layer (80)	grouseberry cream mountain-heather	60 15	alpine timothy spike trisetum creeping sibbaldia arrow-leaved ragwort	3 3 3 3
Moss, lichen and liverwort layer (0)	-		-	

CHARACTER SPECIES

Present	Absent
alpine fir cream mountain-heather heart-leaved arnica	Engelmann spruce smooth Pacific menziesia white-flowered rhododendron Sitka valerian yellow glacier lily

TERRAIN AND SOILS

Terrain: colluvial blanket

Soil Texture: silt loam to sandy loam
Soil Association Comp: COY_2
Moisture regime: mesic
Drainage: well

TOPOGRAPHY

Elevation: 2300 m
Slope: 85%
Aspect: 230°
Landscape position: upper slope

ECOLOGY

- harsh environmental conditions restrict tree growth
- slow nutrient cycling because of limited biotic decomposition
- deep snow accumulation

SUCCESSION

- normal rate of succession although succession is relatively slow in this subzone because of harsh climatic conditions

CHAPTER THREE

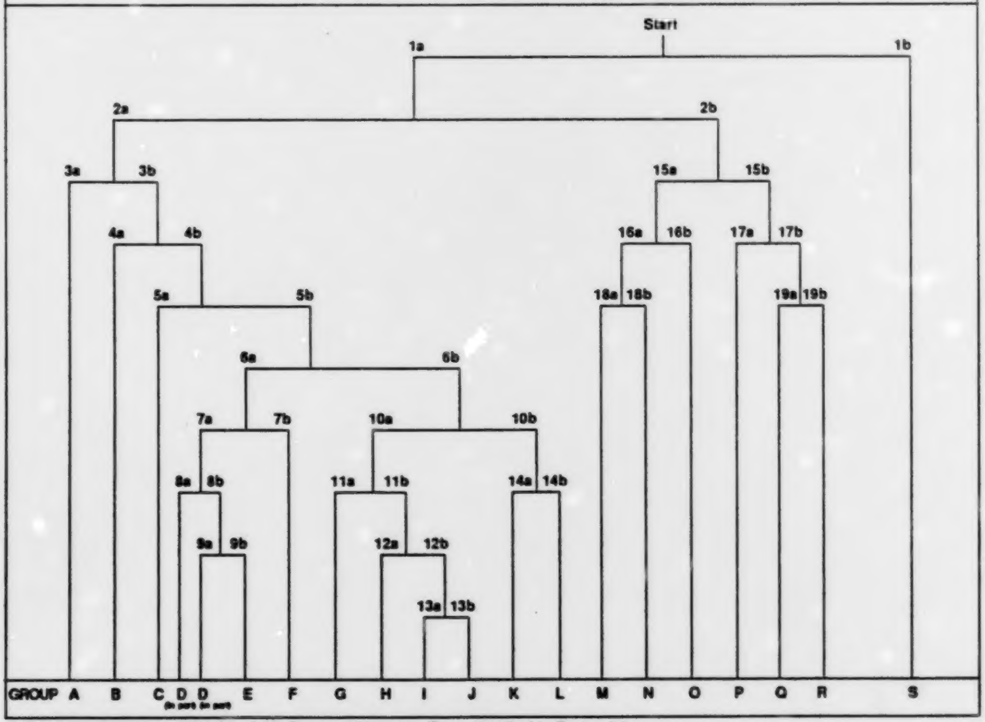
KEY TO THE BROAD GROUPS OF VEGETATION TYPES

3.1 KEY TO THE BROAD GROUPS OF VEGETATION TYPES

The following key is designed to enable identification of Broad Groups of Vegetation Types in the field. At each step of the key there is a choice between two lists of species, one on an 'a' side and the second on a 'b' side. Species listed, except for those in parenthesis, are restricted to one side of a step. Species listed in parenthesis are usually associated with the indicated side of a step but may on occasion occur on the alternate side. A general description of the vegetation is given for each side of a step to aid identification. To key to the Vegetation Type level, once the Broad Group is decided upon, go to Section 3.2.

Figure 3.1 illustrates the degree of similarity and differences between the 19 broad groups. The Broad Groups are described in Section 2.1.

Figure 3.1 Relationship between the Groups of Vegetation Types*


Start
1a
1b
2a
2b
3a
3b
4a
4b
5a
5b
6a
6b
7a
7b
8a
8b
9a
9b
10a
10b
11a
11b
12a
12b
13a
13b
14a
14b
15a
15b
16a
16b
17a
17b
18a
18b
19a
19b
GROUP
A
B
C
D
(in part)
D
(in part)
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S

* This figure shows the relationship of the Groups of Vegetation Types described in Section 2.2. The numbers and lower case letters (e.g. 2a) refer to steps of the Key to the Groups in Section 2.1.

1a Includes various closed to open forested vegetation usually with tree species over 2 m high or grasslands. Various elevations.

common saskatoon
birch-leaved spirea
smooth Pacific menziesia
soopolallie
western thimbleberry
pine grass
Canadian bunchberry
northern twinflower
showy aster
fireweed
kinnikinnick
Sitka valerian
bluebunch wheat grass
Idaho fescue
arrow-leaved balsamroot

Go to lead 2

1b Includes various non-forested vegetation including wetlands, riparian vegetation and high elevation krummholz and alpine vegetation.

Richardson's crane's-bill
sedges (in fen habitats)
rushes
common silverweed
creek goldenrod
common timothy
yellow mountain-avens
broad-leaved willowherb
Lyall's phacelia
western pasqueflower
creeping sibbaldia
mountain vahlodea
mountain-heather
woolly pussytoes

GO TO GROUP S*

2a Generally closed forests which lack regeneration of Rocky Mountain Douglas-fir (except group G). Forests usually dominated by lodgepole pine, alpine fir, Engelmann spruce, white spruce or western red cedar.

black cottonwood
western red cedar
smooth Pacific menziesia
arrow-leaved ragwort
Sitka valerian
oak fern
bear-grass
blue-leaved cinquefoil
(alpine fir)
(thin-leaved mountain alder)
(blue-bead clintonia)
(wild sarsaparilla)
(common horsetail)

Go to lead 3

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* Each group is described in Section 2.1. To key to the Vegetation Type level go to the pertinent Group in Section 2.2.

2b Generally open to closed forests which have regeneration of Rocky Mountain Douglas-fir, or grasslands. Forests usually dominated by ponderosa pine, Rocky Mountain Douglas-fir, western larch or lodgepole pine.

arrow-leaved balsamroot
small western needle grass
Holboell's rock cress
spreading phlox
hairy golden-aster
Richardson's needle grass
(ponderosa pine)
(antelopebush)

(rough fescue)
(bluebunch wheat grass)
(low pussytoes)
(field pussytoes)
(nodding onion)
(three-spot mariposa lily)
(round-leaved alumroot)

Go to lead 15

3a High elevation (above 2200 m) open forests or krummholz vegetation. Dominated by alpine fir, whitebark pine or alpine larch with herb dominated understory.

alpine larch
blue-leaved cinquefoil
alpine blue grass

(alpine timothy)
(northern goldenrod)
(thread-leaved sandwort)

GO TO GROUP A

3b Generally closed to open forests of medium elevation (1350 to 2200 m). Dominated by lodgepole pine, alpine fir or Engelmann spruce with shrub dominated understory.

Rocky Mountain Douglas-fir
western larch
trembling aspen
white spruce
western red cedar
thin-leaved mountain alder
soopolallie

western red-osier dogwood
creeping Oregon-grape
common snowberry
Canadian bunchberry
timber milk-vetch
dwarf blueberry

Go to lead 4

4a Medium to high elevation (1450 to 2150 m), open, mature forests or vegetation of avalanche tracts. Understory is dominated by smooth Pacific menziesia and grouseberry.

(green false hellebore)
(arrow-leaved ragwort)

GO TO GROUP B

4b Generally medium elevation closed forests of young to mature successional stages. Understory has various dominants.

- trembling aspen
- white spruce
- black cottonwood
- western red cedar
- common saskatoon
- willows
- creeping Oregon-grape
- common snowberry
- pine grass

Go to lead 5

5a Medium to high elevation (1400 to 2200 m) open, young seral forests dominated by lodgepole pine or willow with an understory dominated by grouseberry and fireweed.

- subalpine fleabane
- (whitebark pine)
- (common pearly everlasting)
- (spike trisetum)
- (yellow penstemon)
- (arrow-leaved ragwort)

GO TO GROUP C

5b Generally medium elevation, closed forests of young to mature successional stages. Understory has various dominants.

- western red cedar
- white spruce
- trembling aspen
- common snowberry
- Rocky Mountain juniper
- Canadian bunchberry
- sweet-scented bedstraw
- dwarf blueberry

Go to lead 6

6a Open to closed forests dominated by alpine fir, Engelmann spruce and lodgepole pine. Understory dominated by smooth Pacific menziesia and grouseberry.

- arrow-leaved ragwort
- green false hellebore
- (white-flowered rhododendron)

Go to lead 7

6b Open to closed forests dominated by lodgepole pine, Rocky Mountain Douglas-fir or western larch. Understory is dominated by birch-leaved spirea, soopolallie and pine grass.

dwarf red blackberry
American vetch
(trembling aspen)
(white spruce)
(common snowberry)
(kinnikinnick)
(dwarf blueberry)
(cream-coloured peavine)
(wild sarsaparilla)

Go to lead 10

7a Open to closed forests dominated by Engelmann spruce, alpine fir or lodgepole pine. The understory generally has smooth Pacific menziesia, grouseberry, northern twinflower, few-flowered one-sided wintergreen and common moss.

northern bedstraw
(western mountainbells)
(dwarf scouring-rush)
(common mitrewort)

Go to lead 8

7b Generally closed forests dominated by lodgepole pine or Engelmann spruce frequently with western red cedar regeneration. The understory frequently has birch-leaved spirea, black blueberry, oak fern and blue-bead clintonia.

western hemlock
green false hellebore
spiny shield fern
(western red cedar)
(Rocky Mountain maple)
(hawkweed)
(blue-bead clintonia)
(unifoliate-leaved foamflower)

GO TO GROUP F

8a Open forest dominated by alpine fir and Engelmann spruce. Understory has alpine fir regeneration, northern twinflower, few-flowered one-sided wintergreen and common moss.

whitebark pine

GO TO GROUP D (in part)

8b Open to closed forests dominated by Engelmann spruce, alpine fir or lodgepole pine. The understory generally has smooth Pacific menziesia, grouseberry, northern twinflower and few-flowered one-sided wintergreen.

thin-leaved mountain alder
willow
common saskatoon
soopolallie
Utah honeysuckle

smooth Pacific menziesia
fireweed
stiff club-moss
showy aster

Go to lead 9

9a Open to closed forests dominated by Engelmann spruce, alpine fir or lodgepole pine with an understory of smooth Pacific menziesia, grouseberry, heart-leaved arnica and few-flowered one-sided wintergreen.

thin-leaved mountain alder
western thimbleberry
Sitka valerian
Rocky Mountain ragwort

sickle-top lousewort
(western larch)
(dwarf blueberry)

GO TO GROUP D (in part)

9b Open to closed forest dominated by Engelmann spruce or lodgepole pine with an understory of smooth Pacific menziesia, soopolallie, grouseberry, Canadian bunchberry and northern twinflower.

fairyslipper
common pink pyrola
(creeping Oregon-grape)

GO TO GROUP E

10a Open to closed forests generally dominated by lodgepole pine. Found on lower mountain slopes or terraces. The understory is dominated by birch-leaved spirea, soopolallie and pine grass.

grouseberry
timber milk-vetch
dwarf blueberry

western mountainbells
(smooth Pacific menziesia)
(hawkweed)

Go to lead 11

10b Generally closed forests of moist valley bottom positions. The stands are dominated by white spruce, western red cedar, Engelmann spruce or trembling aspen with an understory comprised of some of the following: common snowberry, western thimbleberry, western red-osier dogwood, sedge, wild rye grass and Canadian bunchberry.

common horsetail
(black cottonwood)
(western red-osier dogwood)
(blue elder)
(oak fern)
(common mitrewort)

Go to lead 14

11a Generally young, closed forests dominated by lodgepole pine with an understory of birch-leaved spirea, soopolallie and pine grass. Of lower mountain slopes and terraces.

three-spot mariposa lily
(wood strawberry)

GO TO GROUP G

11b Young to mature, closed forests dominated by lodgepole pine with an understory of birch-leaved spirea, soopolallie, Utah honeysuckle, pine grass, northern twinflower and heart-leaved arnica. Of lower mountain slopes and terraces.

northern bedstraw
(black swamp gooseberry)
(twinberry honeysuckle)
(smooth Pacific menziesia)
(high bush cranberry)
(timber milk-vetch)
(cream-coloured peavine)

Go to lead 12

12a Generally closed stands dominated by lodgepole pine with an understory of birch-leaved spirea, soopolallie, thin-leaved mountain alder, pine grass and northern twinflower. Of lower mountain slopes and terraces.

red baneberry
sweet-scented bedstraw
(black swamp gooseberry)

GO TO GROUP H

12b Generally closed stands dominated by lodgepole pine with an understory of soopolallie, pine grass, dwarf blueberry and Canadian bunchberry. Of terraces and lower mountain slopes.

northern bedstraw
timber milk-vetch
early blue violet
star-flowered false Solomon's-seal
common mitrewort

dwarf red blackberry
(white spruce)
(western yarrow)
(dwarf blueberry)
(stiff club-moss)

Go to lead 13

13a Generally closed forests dominated by lodgepole pine. The understory has soopolallie, pine grass and northern twinflower.

wood strawberry
star-flowered false Solomon's-seal
(white spruce)

GO TO GROUP I

13b Generally closed forests dominated by lodgepole pine. The understory has soopolallie, pine grass, Canadian bunchberry and northern twinflower.

western red cedar
Sitka mountain-ash
common mitrewort

dwarf red blackberry
(common pink pyrola)
(stiff club-moss)

GO TO GROUP J

14a Closed stands with western red cedar or white spruce regeneration of moist valley floor positions. The understory has western thimbleberry, sweet-scented bedstraw, mountain sweetcicely and oak fern.

western red cedar
Oregon boxwood

black blueberry
(blue-bead clintonia)

GO TO GROUP K

14b Closed forests of moist valley floor sites. The stands are dominated by white spruce, Engelmann spruce or trembling aspen. The lush understory has various combinations of western red-osier dogwood, common snowberry, common horsetail, Canadian bunchberry and wild rye grass.

Rocky Mountain juniper
shrubby cinquefoil
northern bedstraw
dwarf scouring-rush

(common juniper)
(soopolallie)
(willows)

GO TO GROUP L

15a Generally open to closed stands dominated by lodgepole pine, western larch, trembling aspen or Rocky Mountain Douglas-fir. The understory is dominated by soopolallie, birch-leaved spirea, common juniper, pine grass, kinnikinnick and heart-leaved arnica. Found on lower mountain slopes and valley floors.

Utah honeysuckle
Oregon boxwood
western meadow-rue
dwarf blueberry

(western larch)
(trembling aspen)
(Rocky Mountain maple)
(creeping Oregon-grape)

Go to lead 16

15b Open to parkland forests dominated by ponderosa pine and Rocky Mountain Douglas-fir. The understory is dominated by common saskatoon, antelopebush, rough fescue, bluebunch wheat grass, needle grass and kinnikinnick. Found on plains and lower mountain slopes.

shaggy fleabane
yellow salsify
(antelopebush)
(Holboell's rock cress)
(slender hawk's-beard)
(desert parsley)

(prairie crocus)
(prairie koeleria)
(spreading phlox)
(old man's whiskers)
(hairy golden-aster)

Go to lead 18

16a Generally closed forests dominated by Rocky Mountain Douglas-fir, western larch or lodgepole pine. The understory consists of soopolallie, creeping Oregon-grape, birch-leaved spirea, pine grass, kinnikinnick and heart-leaved arnica.

Utah honeysuckle	(false Solomon's-seal)
small-flowered blue-eyed Mary	(common western pipsissewa)
arrow-leaved balsamroot	

Go to lead 17

16b Generally open forests dominated by trembling aspen or lodgepole pine. The understory consists of soopolallie, birch-leaved spirea, pine grass, kinnikinnick and western yarrow or common snowberry, northern bedstraw and Kentucky blue grass. Usually of lower mountain slopes but may be found at higher elevations (1700 -2200 m) on southern exposures.

wild rye grass
(spike-like goldenrod)

GO TO GROUP O

17a Generally closed forests dominated by Rocky Mountain Douglas-fir. The understory consists of soopolallie, birch-leaved spirea, pine grass, kinnikinnick, showy aster and timber milk-vetch.

yellow penstemon
timber milk-vetch
(northern bedstraw)

GO TO GROUP M

17b Generally closed forests dominated by Rocky Mountain Douglas-fir or western larch. The understory consists of creeping Oregon-grape, birch-leaved spirea, soopolallie, pine grass, heart-leaved arnica and kinnikinnick.

willow (tall shrub layer)
false Solomon's-seal
(western meadow-rue)

GO TO GROUP N

18a Open to parkland forest dominated by ponderosa pine, Rocky Mountain Douglas-fir or lodgepole pine. The understory consists of common saskatoon, antelopebush, bluebunch wheat grass, rough fescue and prairie koeleria. Of lower slopes or plains.

Richardson's needle grass

GO TO GROUP P

18b Open to parkland forests dominated by ponderosa pine and Rocky Mountain Douglas-fir or grasslands dominated by needle grass. In forested stands the understory is dominated by common saskatoon, antelopebush, bluebunch wheat grass, prairie koeleria and pussytoes. Of plains and lower slopes.

Rocky Mountain juniper - (tall shrub layer)
snowbush ceanothus
choke cherry
Pacific anemone
(ponderosa pine - tall shrub layer)
(small western needle grass)
(old man's whiskers)
(Nuttall's pussytoes)

Go to lead 19

19a Open to parkland forests dominated by ponderosa pine or Rocky Mountain Douglas-fir. The understory consists of common saskatoon, antelopebush, kinnikinnick, prairie koeleria and bluebunch wheat grass.

ponderosa pine (tall shrub layer)
mallow ninebark
field pussytoes
showy aster
(choke cherry)
(birch-leaved spirea)
(round-leaved alumroot)

GO TO GROUP Q

19b Open to parkland forests dominated by ponderosa pine or Rocky Mountain Douglas-fir or grassland vegetation of needle grass or drooping brome. The understory consists of common saskatoon, common snowberry, Rocky Mountain juniper, bluebunch wheat grass, prairie koeleria, pussytoes and shaggy fleabane.

hairy golden-aster
(shaggy fleabane)
(brown-eyed Susan)
(drooping brome grass)
(Idaho fescue)

GO TO GROUP R

3.2 KEY TO THE VEGETATION TYPES

The following keys make it possible to identify vegetation types in the field. A key is provided for each Broad Group. The key in Section 3.1 will direct the user to the appropriate Broad Group. At each step of the key there is a choice between two lists of species, one on an 'a' side and the other on a 'b' side. Species listed, except those in parenthesis, are restricted to one side of a step. Species listed in parenthesis are usually associated with the indicated side of a step, but may on occasion occur on the alternate side. When a vegetation type is reached, the number and name of the type is given below the species list. Keying at a particular step may become difficult because of similarities of vegetation on either side of the step. In this case the side that fits best should be chosen.

The description of each vegetation type is found in Section 2.2. The Vegetation Types are listed by their Broad Group in this section.

3.2.1 KEY TO GROUP A

1a tree species
alpine blue grass
common pearly everlasting

Go to lead 2

1b mountain vahlodea
116) Mountain vahlodea - alpine timothy - arrow-leaved ragwort

2a white-flowered rhododendron
(alpine fir - tree layer)
1) Alpine fir - white-flowered rhododendron - grouseberry - Sitka valerian

2b shrubby cinquefoil
round-leaved alumroot
(sulphur hedysarum)
(alpine timothy)
(blue-leaved cinquefoil)

Go to lead 3

3a without the species in lead 3b

2) White mountain avens - blue-leaved cinquefoil - alpine blue grass

3b tree species
common juniper
shrubby cinquefoil
Indian paintbrush
western yarrow
fireweed
grouseberry
arrow-leaved ragwort
spike trisetum
Sitka valerian
lance-leaved stonecrop
thread-leaved sandwort
northern goldenrod

Go to lead 4

4a without those in lead 4b

3) Grouseberry - wild strawberry - western pasqueflower

4b whitebark pine
common juniper
sulphur hedysarum
lance-leaved stonecrop

Go to lead 5

5a without the species in lead 5b

4) White mountain avens - sedge - spike trisetum

5b alpine fir
common juniper
fireweed
grouseberry
Sitka valerian
alpine timothy

Go to lead 6

6a without the species in lead 6b

5) Whitebark pine - grouseberry - round-leaved alumroot

6b Sitka valerian
alpine timothy
arrow-leaved ragwort

Go to lead 7

7a (alpine larch)
(alpine blue grass)
6) Alpine fir - western yarrow - alpine timothy

7b fireweed
grouseberry
round-leaved alumroot
subalpine fleabane
lance-leaved stonecrop

Go to lead 8

8a shrubby cinquefoil
7) Willow - round-leaved alumroot - lance-leaved stonecrop

8b western meadow-rue
subalpine fleabane
thread-leaved sandwort
8) Alpine fir - subalpine fleabane - Sitka valerian

3.2.2 KEY TO GROUP B

1a wild strawberry
wild rye grass
common cow-parsnip

Go to lead 2

1b yellow wood violet
(few-flowered one-sided wintergreen)

Go to lead 5

2a (northern twinflower)
9) Alpine fir - smooth Pacific menziesia - grouseberry - heart-leaved arnica

2b sweet-scented bedstraw
evergreen yellow violet
green false hellebore

Go to lead 3

3a (western mountainbells)
10) Alpine fir - white-flowered rhododendron - grouseberry - western mountain-bells

3b large-leaved rattlesnake orchid
western meadow-rue
bracted lousewort
unifoliate-leaved foamflower

Go to lead 4

4a Sitka valerian
11) Alpine fir - Engelmann spruce - smooth Pacific menziesia - black swamp gooseberry - large-leaved rattlesnake orchid

4b unifoliate-leaved foamflower
sweet-scented bedstraw
heart-leaved twayblade
Canadian bunchberry
12) Alpine fir - smooth Pacific menziesia - heart-leaved arnica - unifoliate-leaved foamflower

5a Sitka mountain alder
(blue elder)
(red baneberry
(common cow-parsnip)
13) Sitka mountain alder - blue elder - common cow-parsnip - western meadow-rue

5b Engelmann spruce
alpine fir
smooth Pacific menziesia
black blueberry
white-flowered rhododendron
heart-leaved arnica
grouseberry
14) Alpine fir - smooth Pacific menziesia - grouseberry - arrow-leaved ragwort

3.2.3 KEY TO GROUP C

1a (thin-leaved mountain alder)
15) Lodgepole pine - smooth Pacific menziesia - grouseberry - fireweed

1b common saskatoon
black swamp gooseberry
common harebell
arrow-leaved ragwort
subalpine fleabane

Go to lead 2

2a (whitebark pine)
16) Lodgepole pine - whitebark pine - birch-leaved spirea - Indian paintbrush

2b Engelmann spruce
trembling aspen
northwestern sedge
spike trisetum
Sitka valerian

Go to lead 3

3a bear-grass
(Oregon boxwood)
(trembling aspen)
17) Willow - soopolallie - yellow penstemon - thistle

3b white-flowered rhododendron
heart-leaved arnica
western meadow-rue
few-flowered one-sided wintergreen
Sitka valerian

Go to lead 4

4a blue elder
arrow-leaved ragwort
green false hellebore
18) Lodgepole pine - blue elder - wild rye grass - fireweed

4b soopolallie
common juniper
smooth Pacific menziesia
pine grass
showy aster
19) Lodgepole pine - soopolallie - grouseberry - pine grass

3.2.4 KEY TO GROUP D

1a creeping Oregon-grape
whitebark pine
kinnikinnick
20) Alpine fir - twinberry honeysuckle - northern twinflower

1b soopolallie
black swamp gooseberry
Utah honeysuckle
black blueberry
showy aster
fireweed
dwarf scouring-rush

Go to lead 2

2a (wild rye grass)

21) Engelmann spruce - soopolallie - grouseberry - northern twinflower

2b common western pipsissewa
large-leaved rattlesnake orchid
northwestern sedge
few-flowered one-sided wintergreen
western mountainbells
dwarf scouring-rush
common mitrewort

Go to lead 3

3a (spike-like goldenrod)

22) Lodgepole pine - smooth Pacific menziesia - common western pipsissewa - western yarrow

3b birch-leaved spirea
twinberry honeysuckle
black blueberry
white-flowered rhododendron
western meadow-rue
mountain sweetcicely
dwarf scouring-rush
common mitrewort

Go to lead 4

4a (yellow glacier lily)

23) Engelmann spruce - smooth Pacific menziesia - thin-leaved mountain alder - large-leaved rattlesnake orchid

4b soopolallie
western thimbleberry
northwestern sedge
fireweed
mountain sweetcicely
false Solomon's-seal
western mountainbells
dwarf scouring-rush
common mitrewort

Go to lead 5

5a (Rocky Mountain ragwort)

24) Engelmann spruce - smooth Pacific menziesia - western mountainbells - common moss

5b birch-leaved spirea
thin-leaved mountain alder
western thimbleberry
showy aster
pine grass
western meadow-rue

Go to lead 6

6a Douglas' aster

25) Engelmann spruce - smooth Pacific menziesia - high bush cranberry - grouseberry - common moss

6b common western pipsissewa
northwestern sedge
few-flowered one-sided wintergreen
green pyrola
red baneberry

Go to lead 7

7a black blueberry
(stiff club-moss)

26) Lodgepole pine - smooth Pacific menziesia - birch-leaved spirea - pine grass - moss

7b western thimbleberry
mountain sweetcicely
common mitrewort

Go to lead 8

8a blue elder

27) Engelmann spruce - thin-leaved mountain alder - heart-leaved arnica

8b soopolallie
Rocky Mountain maple
western meadow-rue
mountain sweetcicely
false Solomon's-seal
western mountainbells
dwarf scouring-rush
common mitrewort

Go to lead 9

9a Rocky Mountain maple
western red-osier dogwood
(dwarf scouring-rush)

28) Rocky Mountain Douglas-fir - Rocky Mountain maple - smooth Pacific menziesia - heart-leaved arnica - moss

9b common juniper
common saskatoon
thin-leaved mountain alder
high bush cranberry
wild strawberry
common western pipsissewa
northwestern sedge

29) Lodgepole pine - Utah honeysuckle - high bush cranberry - Canadian bunchberry

3.2.5 KEY TO GROUP E

1a large-leaved rattlesnake orchid

30) Engelmann spruce - white-flowered rhododendron - Canadian bunchberry - moss

1b willows
western mountainbells
showy aster
fireweed

Go to lead 2

2a fairyslipper
yellow wood violet

31) Lodgepole pine - twinberry honeysuckle - heart-leaved arnica - western mountainbells

2b birch-leaved spirea
smooth Pacific menziesia
wild rye grass
common horsetail
common pink pyrola

Go to lead 3

3a Sitka mountain-ash

32) Lodgepole pine - smooth Pacific menziesia - grouseberry - moss

3b common juniper
black swamp gooseberry
willows
pine grass
wild rye grass
rough-fruited fairybells
dwarf scouring-rush
common horsetail

Go to lead 4

4a (common horsetail)

33) Engelmann spruce - baldhip rose - Canadian bunchberry - common horsetail

4b smooth Pacific menziesia
pine grass
heart-leaved arnica
fireweed
grouseberry
Douglas' aster
western mountainbells

34) Engelmann spruce - soopolallie - twinberry honeysuckle - northern twinflower - western meadow-rue

3.2.6 KEY TO GROUP F

1a without the species in lead 1b

35) Lodgepole pine - birch-leaved spirea - grouseberry - heart-leaved arnica - fireweed

1b western red cedar
western hemlock
Rocky Mountain maple
false Solomon's-seal
common pink pyrola
oak fern

Go to lead 2

2a bear-grass
early blue violet
(common pink pyrola)

36) Engelmann spruce - western hemlock - Oregon boxwood - bear-grass

2b birch-leaved spirea
smooth Pacific menziesia
common Labrador tea
fireweed

Go to lead 3

3a (oak fern)
(spiny shield fern)

37) Alpine fir - western red cedar - Rocky Mountain maple - blueberry - oak fern

3b soopolallie
creeping Oregon-grape
showy aster
common western pipsissewa
pine grass

Go to lead 4

4a (western red cedar)
(western hemlock)

38) Lodgepole pine - western red cedar - birch-leaved spirea - blue-bead clintonia

4b twinberry honeysuckle
sweet-scented bedstraw
mountain sweetcicely
green false hellebore
cucumberroot twistedstalk

39) Lodgepole pine - alpine fir - western thimbleberry - showy aster

3.2.7 KEY TO GROUP G

1a (layered moss)
115) Rocky Mountain Douglas-fir - layered moss

1b western larch
soopolallie
wild strawberry
northern twinflower
fireweed
Go to lead 2

2a (western yarrow)
(sulphur hedysarum)
(common harebell)
(dwarf blueberry)
(lupines)
Go to lead 3

2b wild rye grass
mountain sweetcicely
(few-flowered one-sided wintergreen)
Go to lead 4

3a sulphur hedysarum
(western meadow-rue)
(blue-bead clintonia)
40) Lodgepole pine - Rocky Mountain Douglas-fir - common saskatoon - pine grass - wild strawberry

3b alpine fir
western yarrow
heart-leaved arnica
three-spot mariposa lily
41) Lodgepole pine - birch-leaved spirea - pine grass - dwarf blueberry

4a American vetch
Go to lead 5

4b alpine fir
(western red cedar)
(black blueberry)
(western red-osier dogwood)
44) Lodgepole pine - western red cedar - Oregon boxwood - northern twinflower

5a (Rocky Mountain maple)
(common western pipsissewa)
(large-leaved rattlesnake orchid)
(Douglas' aster)
42) Lodgepole pine - Rocky Mountain maple - soopolallie - pine grass

5b (Engelmann spruce) (grouseberry)
(Oregon boxwood) (common pearly everlasting)
43) Trembling aspen - soopolallie - pine grass - fireweed

3.2.8 KEY TO GROUP H

1a without the species in lead 1b
121) Western thimbleberry - western meadow-rue - fireweed

1b tree species in tree layer
common juniper pine grass
soopolallie heart-leaved arnica

Go to lead 2

2a western yarrow
45) Rocky Mountain Douglas-fir - common juniper - wild strawberry - sulphur hedysarum

2b western larch
creeping Oregon-grape large-leaved rattlesnake orchid
common snowberry green pyrola
thin-leaved mountain alder

Go to lead 3

3a without those in lead 3b
46) Lodgepole pine - trembling aspen - birch-leaved spirea - pine grass - grouseberry

3b common snowberry few-flowered one-sided wintergreen
black swamp gooseberry western meadow-rue
twinberry honeysuckle green pyrola
northwestern sedge

Go to lead 4

4a elegant death-camas
(Rocky Mountain maple)
47) Lodgepole pine - common snowberry - high bush cranberry - pine grass - northwestern sedge

4b black blueberry
thin-leaved mountain alder
Oregon boxwood
racemose pussytoes
evergreen yellow violet
(fireweed)

Go to lead 5

5a western mountainbells
(sulphur hedysarum)
(lupine)
48) Lodgepole pine - thin-leaved mountain alder - soopolallie - pine grass - sulphur hedysarum

5b twinberry honeysuckle
black blueberry
smooth Pacific menziesia
western thimbleberry
Oregon boxwood
hawkweed
northwestern sedge
sweet-scented bedstraw
evergreen yellow violet

Go to lead 6

6a Indian paintbrush
Douglas' aster
dwarf scouring-rush
49) Lodgepole pine - soopolallie - showy aster - Indian paintbrush

6b Rocky Mountain Douglas-fir
common saskatoon
twinberry honeysuckle
smooth Pacific menziesia
Oregon boxwood
common western pipsissewa
large-leaved rattlesnake orchid
mountain sweetcicely

Go to lead 7

7a without the species in lead 7b
(Sitka valerian)
50) Lodgepole pine - birch-leaved spirea - black blueberry - fireweed

7b soopolallie
pine grass
showy aster
Canadian bunchberry
northern twinflower
grouseberry

Go to lead 8

8a high bush cranberry
(wild rye grass)
51) Lodgepole pine - western thimbleberry - pine grass - cream-coloured peavine

8b green pyrola
false Solomon's-seal
rough-fruited fairybells
(thin-leaved mountain alder)

Go to lead 9

9a twinberry honeysuckle
western red-osier dogwood
round-leaved alumroot
cream-coloured peavine
American vetch
spiny shield fern
Hooker's fairybells
52) Lodgepole pine - thin-leaved mountain alder - soopolallie - northern twinflower

9b Rocky Mountain Douglas-fir
creeping Oregon-grape
kinnikinnick
northwestern sedge
53) Lodgepole pine - thin-leaved mountain alder - birch-leaved spirea - pine grass - northwestern sedge

3.2.9 KEY TO GROUP I

1a Indian paintbrush
sulphur hedysarum

Go to lead 2

1b creeping Oregon-grape
common western pipsissewa
large-leaved rattlesnake orchid
green pyrola

Go to lead 3

2a white spruce
timber milk-vetch
54) Lodgepole pine - white spruce - soopolallie - pine grass

2b Engelmann spruce
common saskatoon
Utah honeysuckle
Indian paintbrush
kinnikinnick
grouseberry
cream-coloured peavine
Douglas' aster

55) Lodgepole pine - soopolallie - rose - pine grass - Indian paintbrush

3a without the species in lead 3b

56) Lodgepole pine - white spruce - creeping Oregon-grape - pine grass - northern twinflower

3b Rocky Mountain juniper
western yarrow
northwestern sedge
wild rye grass
American vetch
(Engelmann spruce)

Go to lead 4

4a smooth Pacific menziesia
(grouseberry)

57) Lodgepole pine - soopolallie - pine grass - dwarf blueberry

4b western thimbleberry
Rocky Mountain maple
western yarrow
mountain sweetcicely
star-flowered false Solomon's-seal
(common western pipsissewa)

Go to lead 5

5a black blueberry
high bush cranberry
blue-bead clintonia
American vetch
(star-flowered false Solomon's-seal)

58) Lodgepole pine - soopolallie - pine grass - star-flowered false Solomon's- seal

5b common saskatoon
Rocky Mountain maple
hawkweed
large-leaved rattlesnake orchid
northwestern sedge
timber milk-vetch
Canada violet

Go to lead 6

6a twinberry honeysuckle
willows
grouseberry
common harebell

59) Lodgepole pine - soopolallie - birch-leaved spirea - pine grass - dwarf blueberry

6b western thimbleberry
Canadian bunchberry
western meadow-rue
wild rye grass
false Solomon's-seal
rough-fruited fairybells
rough-leaved rice grass

60) Rocky Mountain Douglas-fir - soopolallie - pine grass - Canada violet

3.2.10 KEY TO GROUP J

1a without the species in lead 1b

61) Lodgepole pine - soopolallie - pine grass - wild rye grass

1b creeping Oregon-grape
twinberry honeysuckle
northwestern sedge
grouseberry
common mitrewort
false Solomon's-seal

Go to lead 2

2a common pink pyrola
(lupine)

62) Lodgepole pine - birch-leaved spirea - pine grass - lupine

2b western thimbleberry
twinberry honeysuckle
Canadian bunchberry
western meadow-rue
fireweed
green pyrola
rough-fruited fairybells
rough-leaved rice grass
dwarf red blackberry

Go to lead 3

3a Oregon boxwood
(western red cedar)

63) Lodgepole pine - birch-leaved spirea - pine grass - American vetch

3b smooth Pacific menziesia
high bush cranberry
kinnikinnick
wild rye grass
stiff club-moss
common mitrewort

Go to lead 4

4a smooth Pacific menziesia
dwarf scouring-rush
common mitrewort
one-flowered wintergreen
64) Lodgepole pine - soopolallie - pine grass - stiff club-moss

4b without the species in lead 4a
Go to lead 5

5a Douglas' aster
wild sarsaparilla
65) Lodgepole pine - soopolallie - Canadian bunchberry - grouseberry

5b common juniper
kinnikinnick
western yarrow
fireweed
grouseberry
evergreen yellow violet
66) Lodgepole pine - soopolallie - pine grass - fireweed

3.2.11 KEY TO GROUP K

1a cream-coloured peavine
67) White spruce - western thimbleberry - sweet-scented bedstraw - star-flowered false Solomon's-seal

1b black blueberry
fireweed
(Utah honeysuckle)
(oak fern)
(common horsetail)
(large-leaved rattlesnake orchid)
Go to lead 2

2a oak fern
unifoliate-leaved foamflower
cucumberroot twistedstalk
68) Western red cedar - western thimbleberry - oak fern

2b creeping Oregon-grape
common snowberry
western red-osier dogwood
69) Rocky Mountain Douglas-fir - western thimbleberry - sweet-scented bedstraw - false Solomon's-seal

3.2.12 KEY TO GROUP L

1a without the species in lead 1b

70) White spruce - willow - sedge - common pink pyrola

1b common juniper
soopolallie
common saskatoon
creeping Oregon-grape
black swamp gooseberry
cream-coloured peavine
rough-leaved rice grass
star-flowered false Solomon's-seal
Canada violet

Go to lead 2

2a without the species in lead 2b

Go to lead 3

2b Engelmann spruce
Utah honeysuckle
blue elder
oak fern
(false Solomon's-seal)

Go to lead 4

3a high bush cranberry
Idaho fescue

71) Trembling aspen - common snowberry - willow - star-flowered false Solomon's-seal

3b creeping Oregon-grape
western red-osier dogwood
northern twinflower
green pyrola
northern bedstraw
Douglas' aster
rough-leaved rice grass

72) White spruce - western red-osier dogwood - star-flowered false Solomon's-seal - Douglas' aster

4a (common cow-parsnip)
(western thimbleberry)
(bracted lousewort)
(common pearly everlasting)

73) Willow - twinberry honeysuckle - wild rye grass - common cow-parsnip

4b common juniper
soopolallie
common saskatoon
creeping Oregon-grape
common snowberry
Canadian bunchberry
northern twinflower
northern bedstraw
wild sarsaparilla
star-flowered false Solomon's-seal

Go to lead 5

5a American vetch
(sulphur hedysarum)
(evergreen yellow violet)
(spiny shield fern)
74) Trembling aspen - common snowberry - wild rye grass - cream-coloured peavine

5b creeping Oregon-grape
twinberry honeysuckle
Utah honeysuckle
high bush cranberry
northern twinflower
few-flowered one-sided wintergreen
rough-leaved rice grass
common pink pyrola
dwarf scouring-rush
common mitrewort
dwarf red blackberry

Go to lead 6

6a blue elder
shrubby cinquefoil
oak fern
(Douglas' aster)
75) Engelmann spruce - common snowberry - northern twinflower - dwarf red blackberry

6b white spruce
birch-leaved spirea
pine grass
fireweed
green pyrola
rough-fruited fairybells
red baneberry

Go to lead 7

7a Engelmann spruce
smooth Pacific menziesia
northwestern sedge
early blue violet
one-flowered wintergreen

Go to lead 8

7b common juniper
wood strawberry

Go to lead 9

8a (common horsetail)

112) Engelmann spruce - black swamp gooseberry - common horsetail

8b common saskatoon
common snowberry
Utah honeysuckle
western red-osier dogwood
high bush cranberry
Canadian bunchberry
few-flowered one-sided wintergreen
false Solomon's-seal
rough-fruited fairybells
dwarf red blackberry

76) Engelmann spruce - common snowberry - Canadian bunchberry - false Solomon's-seal

9a Utah honeysuckle
common cow-parsnip
(dwarf red blackberry)
(green pyrola)

113) White spruce - common horsetail - palmate colt's-foot - common moss

9b Rocky Mountain Douglas-fir
lodgepole pine
soopolallie
common saskatoon
creeping Oregon-grape
common snowberry
pine grass
Canadian bunchberry
northern twinflower
rough-leaved rice grass

Go to lead 10

10a (western thimbleberry)

114) Lodgepole pine - white spruce - baldhip rose - wild rye grass

10b soopolallie
creeping Oregon-grape
pine grass
Canadian bunchberry
northern twinflower
rough-leaved rice grass
star-flowered false Solomon's-seal

77) White spruce - common snowberry - Canadian bunchberry - star-flowered false Solomon's-seal

3.2.13 KEY TO GROUP M

1a (rose)
(northwestern sedge)
(Douglas' aster)

Go to lead 2

1b Hooker's fairybells
(round-leaved alumroot)
(common pearly everlasting)

Go to lead 3

2a (Rocky Mountain juniper)
(rosy pussytoes)
(Douglas' aster)
(wood strawberry)
(northwestern sedge)

78) Rocky Mountain Douglas-fir - common juniper - pine grass - heart-leaved arnica

2b dwarf blueberry
northern bedstraw

79) Lodgepole pine - soopolallie - pine grass - kinnikinnick

3a Douglas' aster
brown-eyed Susan

80) Rocky Mountain Douglas-fir - soopolallie - pine grass - yellow penstemon

3b field pussytoes
large-leaved rattlesnake orchid
sulphur hedysarum
three-spot mariposa lily
American vetch
common pearly everlasting

Go to lead 4

4a Rocky Mountain juniper
(large-leaved rattlesnake orchid)
(timber milk-vetch)
(Hooker's fairybells)

81) Rocky Mountain Douglas-fir - birch-leaved spirea - pine grass - racemose pussytoes

4b Utah honeysuckle
yellow penstemon
common pearly everlasting

Go to lead 5

5a sulphur hedysarum
arrow-leaved balsamroot
bluebunch wheat grass

82) Rocky Mountain Douglas-fir - birch-leaved spirea - pine grass - heart-leaved arnica

5b common juniper
nodding onion
yellow penstemon
early blue violet
rosy pussytoes
83) Rocky Mountain Douglas-fir - lodgepole pine - birch-leaved spirea - pine grass - northern bedstraw

3.2.14 KEY TO GROUP N

1a black swamp gooseberry
Oregon boxwood
common harebell
84) Rocky Mountain Douglas-fir - common saskatoon - pine grass - round-leaved alumroot

1b western larch
lodgepole pine
soopolallie
northern twinflower
Go to lead 2

2a choke cherry
false Solomon's-seal
small-flowered blue-eyed Mary
85) Rocky Mountain Douglas-fir - birch-leaved spirea - kinnikinnick - nodding onion

2b western meadow-rue
arrow-leaved balsamroot
lupine
(sulphur hedysarum)
Go to lead 3

3a (arrow-leaved balsamroot)
86) Rocky Mountain Douglas-fir - pine grass - three-spot mariposa lily

3b soopolallie
common snowberry
Utah honeysuckle
showy aster
sulphur hedysarum
dwarf blueberry
Go to lead 4

4a western meadow-rue
sulphur hedysarum
87) Lodgepole pine - soopolallie - pine grass - sulphur hedysarum

4b Utah honeysuckle
western yarrow
showy aster
fireweed
early blue violet
Hooker's fairybells

Go to lead 5

5a nodding onion
(dwarf blueberry)
(fireweed)
88) Western larch - Rocky Mountain Douglas-fir - creeping Oregon-grape - heart-leaved arnica - kinnikinnick

5b common juniper
soopolallie
willow
common western pipsissewa
northwestern sedge
three-spot mariposa lily
early blue violet
fairyslipper
89) Western larch - soopolallie - pine grass - western yarrow

3.2.15 KEY TO GROUP O

1a Rocky Mountain Douglas-fir
common juniper
birch-leaved spirea
nodding onion
northern twinflower
sulphur hedysarum
rough fescue

Go to lead 2

1b (western meadow-rue)
(early blue violet)
(Douglas' aster)
95) Trembling aspen - common snowberry - northern bedstraw - clover

2a gooseberry
whitebark pine
rough fescue
lance-leaved stonecrop
(spike trisetum)

Go to lead 3

2b Oregon boxwood
hawkweed
northwestern sedge
Kentucky blue grass

Go to lead 4

3a whitebark pine
round-leaved alumroot
prairie koeleria
spike trisetum
lance-leaved stonecrop

90) Soopolallie - rough fescue - wild strawberry

3b Indian paintbrush
pine grass
timber milk-vetch
elegant death-camas
three-spot mariposa lily
dwarf blueberry
Richardson's needle grass

91) Lodgepole pine - soopolallie - pine grass - timber milk-vetch

4a Oregon boxwood
Kentucky blue grass
(yellow penstemon)

92) Trembling aspen - common saskatoon - pine grass - western yarrow

4b Rocky Mountain Douglas-fir
common snowberry
hawkweed
heart-leaved arnica
northern twinflower
sulphur hedysarum
timber milk-vetch
dwarf blueberry
northern gentian

Go to lead 5

5a Canadian bunchberry
wood strawberry
star-flowered false Solomon's-seal
dusky brown pussytoes
sickle-top lousewort

93) Lodgepole pine - birch-leaved spirea - pine grass - hawkweed

5b Rocky Mountain juniper
northwestern sedge
Pacific anemone

94) Lodgepole pine - soopolallie - pine grass - northern twinflower

3.2.16 KEY TO GROUP P

1a (lodgepole pine)
(silky lupine)
(small-flowered blue-eyed Mary)
111) Lodgepole pine - silky lupine - Richardson's needle grass

1b common saskatoon
birch-leaved spirea
antelopebush
common rabbitbush
kinnikinnick
timber milk-vetch
rough fescue
three-spot mariposa lily

Go to lead 2

2a soopolallie
sulphur hedysarum
showy aster
(spike-like goldenrod)
96) Ponderosa pine - Rocky Mountain Douglas-fir - common saskatoon - pine grass - rough fescue

2b common snowberry
brown-eyed Susan
(Kentucky blue grass)

Go to lead 3

3a (common rabbitbrush)
(three-spot mariposa lily)
117) Common rabbitbrush - bluebunch wheat grass - shaggy fleabane

3b Rocky Mountain Douglas-fir
antelopebush
Rocky Mountain juniper
western yarrow
wild strawberry
pine grass
timber milk-vetch
97) Rocky Mountain Douglas-fir - common saskatoon - bluebunch wheat grass - western yarrow

3.2.17 KEY TO GROUP Q

1a oceanspray
Lewis' mock-orange
mallow ninebark
135) Rocky Mountain maple - oceanspray - bluebunch wheat grass

1b without the species in lead 1a
Go to lead 2

2a without the species in lead 2b
98) Ponderosa pine - common saskatoon - prairie koeleria

2b Indian paintbrush
showy aster
arrow-leaved balsamroot
Pacific anemone
thistles
(old man's whiskers)
Go to lead 3

3a (soopolallie)
(common snowberry)
(showy aster)
(prairie crocus)
(Douglas' aster)
(desert parsley)
Go to lead 4

3b wood strawberry
rough fescue
spreading phlox
(American vetch)
Go to lead 5

4a birch-leaved spirea
(spreading dogbane)
99) Rocky Mountain Douglas-fir - common saskatoon - small western needle grass - western yarrow

4b wood strawberry
rough fescue
spreading phlox
(American vetch)
100) Rocky Mountain Douglas-fir - common saskatoon - kinnikinnick - western yarrow

5a (Rocky Mountain juniper)
(Holboell's rock cress)
(thistles)
101) Ponderosa pine - Rocky Mountain juniper - bluebunch wheat grass - prairie koeleria

5b Indian paintbrush
field pussytoes
hawkweed
western yarrow
kinnikinnick
wild strawberry
pine grass
yellow penstemon
arrow-leaved balsamroot
three-spot mariposa lily
rosy pussytoes
Pacific anemone
old man's whiskers

Go to lead 6

6a without the species in lead 6b
102) Ponderosa pine - antelopebush - bluebunch wheat grass - old man's whiskers

6b birch-leaved spirea
nodding onion
timber milk-vetch
rough fescue
Columbia gromwell
prairie koeleria
Nuttall's pussytoes
103) Rocky Mountain Douglas-fir - common saskatoon - antelopebush - pine grass - western yarrow

3.2.18 KEY TO GROUP R

1a (prairie sagebrush)
118) Rocky Mountain juniper - bluebunch wheat grass - arrow-leaved balsamroot

1b Rocky Mountain Douglas-fir
ponderosa pine
common snowberry
common saskatoon
antelopebush
western yarrow
Nuttall's pussytoes
old man's whiskers
narrow-leaved lomatium
brown-eyed Susan

Go to lead 2

2a (common harebell)
(thistles)
104) Small western needle grass - few-flowered shooting star - three-spot mariposa lily

2b Rocky Mountain Douglas-fir
ponderosa pine
common snowberry
common saskatoon
common juniper
hairy golden-aster
drooping brome grass
shaggy fleabane
bluebunch wheat grass

Go to lead 3

3a (low pussytoes)
105) Needle-and-thread grass - drooping brome grass - low pussytoes

3b Rocky Mountain Douglas-fir
ponderosa pine
common saskatoon
Woods' rose
western yarrow
bluebunch wheat grass
slender hawk's-beard
brown-eyed Susan
rough fescue

Go to lead 4

4a without the species in lead 4b

Go to lead 7

4b redstem ceanothus
(Idaho fescue)
(blue grass)
(pine grass)

Go to lead 5

5a Idaho fescue
common harebell
western needle grass
bluebunch wheat grass

Go to lead 6

5b common timothy
American vetch
showy aster
138) Common saskaton - willow - pine grass - American vetch

6a bluebunch wheat grass
timber milk-vetch
136) Common saskatoon - Idaho fescue - bluebunch wheat grass

6b western needle grass
yellow penstemon
137) Soopolallie - blue grass - western needle grass

7a short-beaked false dandelion
(Rocky Mountain juniper)
106) Rocky Mountain Douglas-fir - Rocky Mountain juniper - kinnikinnick - Pacific anemone

7b antelopebush
choke cherry
three-spot mariposa lily
narrow-leaved lomatium
shaggy fleabane
(rough fescue)

Go to lead 8

8a Columbia brome grass
107) Shaggy fleabane - prairie koeleria - needle-and-thread grass

8b Rocky Mountain Douglas-fir
ponderosa pine
common saskatoon
common snowberry
antelopebush
timber milk-vetch
three-spot mariposa lily
slender hawk's-beard
hairy golden-aster

Go to lead 9

9a wood strawberry
Sandberg's blue grass
(prairie sagebrush)
119) Rocky Mountain Douglas-fir - common saskatoon - bluebunch wheat grass - Nuttall's pussytoes

9b ponderosa pine
antelopebush
timber milk-vetch
slender hawk's-beard
yellow salsify
narrow-leaved lomatium
drooping brome grass

Go to lead 10

10a without the species in lead 10b

108) Rocky Mountain Douglas-fir - common snowberry - arrow-leaved balsamroot - bluebunch wheat grass

10b common juniper
Woods' rose
Holboell's rock cress
Pacific anemone
old man's whiskers

Go to lead 11

11a hawkweed
northern bedstraw
Nuttall's pussytoes

109) Ponderosa pine - Woods' rose - prairie koeleria - northern bedstraw

11b Rocky Mountain juniper
choke cherry
soopolallie
kinnikinnick
wild rye grass
small western needle grass
spreading phlox
dusky brown pussytoes
clovers
field locoweed

Go to lead 12

12a (common rabbitbrush)

120) Ponderosa pine - common rabbitbrush - prairie koeleria - inland blue grass

12b Rocky Mountain Douglas-fir
common juniper
kinnikinnick
timber milk-vetch
rough fescue
bluebunch wheat grass
slender hawk's-beard
Pacific anemone
field locoweed
clover
Idaho fescue

110) Ponderosa pine - common saskatoon - rough fescue - spreading phlox

3.2.19 KEY TO GROUP S

1a common silverweed
rush
(sedges)

Go to lead 2

1b alpine fir
Sitka mountain alder
western birch
mountain-heather
western meadow-rue
common cow-parsnip
(arrow-leaved ragwort)

Go to lead 7

2a common silverweed
common timothy
(rush)

Go to lead 3

2b glandular birch
willow
broad-leaved willowherb
blue-leaved cinquefoil
wild strawberry

Go to lead 5

3a common timothy
inland blue grass
124) Common silverweed - common timothy - creek goldenrod

3b rush
bulrush
field mint

Go to lead 4

4a bulrush
dwarf spike-rush
122) Rush - common silverweed - bulrush

4b field mint
123) Common silverweed - sedge - moss

5a broad-leaved willowherb
Lyall's phacelia
130) Broad-leaved willowherb - Lyall's phacelia - blue grass

5b glandular birch
wild strawberry
arrow-leaved ragwort
mountain vahlodea
fireweed

Go to lead 6

6a wild strawberry
shrubby cinquefoil
arrow-leaved ragwort
131) Diamond willow - sedge - wild strawberry

6b glandular birch
horsetail
palmate colt's-foot
127) Willow - sedge

7a Sitka mountain alder
western meadow-rue
common cow-parsnip
Richardson's crane's-bill

Go to lead 8

7b alpine fir
western birch
mountain-heather
creek goldenrod
yellow mountain-avens
western pasqueflower

Go to lead 9

8a Sitka mountain alder
western spring beauty
128) Sitka mountain alder - western spring beauty - yellow glacier lily

8b Richardson's crane's-bill
arrow-leaved ragwort
129) Richardson's crane's-bill - western meadow-rue - common cow-parsnip

9a western birch
creek goldenrod
125) Western birch - creek goldenrod

9b alpine fir
mountain-heather
yellow mountain-avens
arrow-leaved ragwort

Go to lead 10

10a yellow mountain-avens
wild strawberry
126) Willow - yellow mountain-avens

10b alpine fir
mountain-heather
grouseberry
western pasqueflower
alpine timothy

Go to lead 11

11a Sitka valerian
mountain forget-me-not
132) Arrow-leaved ragwort - western pasqueflower - alpine timothy

11b alpine fir
mountain-heather

Go to lead 12

12a woolly pussytoes
western pasqueflower
133) Mountain-heather - grouseberry - woolly pussytoes

12b alpine timothy
creeping sibbaldia
134) Alpine fir - grouseberry - cream mountain-heather

CHAPTER FOUR

SPECIES AND THEIR MOISTURE REQUIREMENTS

In the following tables (Table 4.1 to Table 4.10), the major species of each Forest Subzone are listed along with their range of soil moisture and soil drainage requirements.

Within any subzone, moisture availability is the single most important determinant of suitability for various plants. These tables will aid to identify the revegetation options for various sites. The plants can also be used as a indicators of the moisture conditions of their rooting zones for specific sites and thus help to identify constraints to its management. Typical examples include droughty conditions inhibiting revegetation or excessive moisture likely to lead to slumping can be identified by the plant species present and by use of appropriate interpretations, adequate precautions may be recommended.

On certain sites, moisture conditions may change significantly with the vegetation succession. In soils of limited soil moisture storage, the development of a shade-providing canopy may reduce evaporation, and accordingly reduce droughtiness. In contrast, moister, rich sites may turn into excessively wet sites with free surface water following removal of the tree canopy, because of reduced moisture usage by the vegetation.

TABLE 4.1
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone/Subzone: Interior Rocky Mountain Douglas-fir Zone/ponderosa pine subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	**Very Xeric**	**Xeric**	**Subxeric**	**Submesic**	**Mesic**	**Subhygric**	**Hygric**	**Subhydric**	**Hydric**
Plant Species									
TREES									
Rocky Mountain Douglas-fir				x	x	x			
ponderosa pine		x	x	x	x	x			
black cottonwood							x		
lodgepole pine				x	x				
trembling aspen				x	x	x	x		
white spruce						x	x		
SHRUBS									
antelopebush			x	x					
birch-leaved spirea				x	x				
choke cherry		x	x						
common juniper				x	x				
common rabbitbrush		x	x						
common saskatoon		x	x	x	x				
common snowberry					x	x	x		
creeping Oregon-grape					x				
glandular birch								x	
prairie sagebrush		x	x	x					
Rocky Mountain juniper			x	x	x				
soopolallie					x				
western red-osier dogwood						x	x		
HERBS									
arrow-leaved balsamroot			x	x					
bitterroot lewisia		x	x						
bluebunch wheat grass			x	x	x				
brown-eyed Susan			x	x					
brown-haired orange-flowered arnica		x	x						
bulrush								x	x
Columbia gromwell				x	x				
common cattail									x
death-camas			x	x					
desert parsley			x	x					
drooping brome grass		x	x	x	x				
dusky brown pussytoes			x	x					
dwarf spike-rush									x
elegant death-camas					x	x			
field mint						x			
field pussytoes				x	x				
Holboell's rock cress			x	x					
Idaho fescue				x	x				
kinnikinnick					x	x			
low pussytoes			x	x					
narrow-leaved lomatium			x	x					
needle-and-thread grass		x	x						
old man's whiskers				x	x				
Pacific anemone				x	x				
parsnip-flowered umbrella-plant			x	x					
prairie koeleria			x	x	x				
Richardson's needle grass		x	x						
rosy pussytoes			x	x					
rough fescue					x				
rush							x	x	
sedges								x	x
shaggy fleabane			x	x					
small western needle grass		x	x						
yellow penstemon			x	x					
yellow salsify			x	x					

TABLE 4.2
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone/Subzone: Interior Rocky Mountain Douglas-fir Zone/western larch-ponderosa pine subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	**Very Xeric**	**Xeric**	**Subxeric**	**Submesic**	**Mesic**	**Subhygric**	**Hygric**	**Subhydric**	**Hydric**
Plant Species									
TREES									
black cottonwood						x	x		
lodgepole pine				x	x	x			
ponderosa pine		x	x	x	x				
Rocky Mountain Douglas-fir				x	x	x			
trembling aspen			x	x	x	x			
western larch				x	x	x			
white spruce						x	x		
SHRUBS									
birch-leaved spirea					x				
choke cherry			x	x					
common juniper				x	x				
common rabbitbrush			x	x					
common saskatoon			x	x	x				
common snowberry					x	x			
creeping Oregon-grape				x	x	x			
Rocky Mountain juniper				x	x				
snowbush ceanothus			x	x					
soopolallie				x	x				
western red-osier dogwood							x		
Wood's rose				x	x				
HERBS									
arrow-leaved balsamroot			x	x					
bluebunch wheat grass				x	x				
brown-eyed Susan			x	x					
bulrush								x	x
Columbia gromwell				x	x				
common cattail									x
death-camas			x	x					
drooping brome grass		x	x						
desert parsley		x	x						
dwarf spike-rush								x	
elegant death-camas				x	x	x			
field locoweed			x	x					
field pussytoes				x	x				
Idaho fescue				x	x				
kinnikinnick				x	x	x			
Nuttall's pussytoes				x					
old man's whiskers			x	x					
Pacific anemone				x	x				
pine grass				x	x	x			
prairie koeleria			x	x					
racemose pussytoes				x	x				
shaggy fleabane			x	x					
showy aster					x	x			
spreading dogbane		x	x	x					
timber milk-vetch				x	x				
western yarrow			x	x	x	x			
wild strawberry				x	x	x			
yellow penstemon				x	x				
yellow salsify			x	x					

TABLE 4.3
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone/Subzone: Interior Rocky Mountain Douglas-fir Zone/lodgepole pine subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	Very Xeric	Xeric	Subxeric	Submesic	Mesic	Subhygric	Hygric	Subhydric	Hydric
Plant Species									
TREES									
black cottonwood						x	x	x	
common paper birch						x			
lodgepole pine			x	x	x	x			
Rocky Mountain Douglas-fir		x	x	x	x	x			
trembling aspen			x	x	x	x	x		
western larch				x	x	x			
western red cedar						x	x		
white spruce						x	x		
SHRUBS									
birch-leaved spirea				x	x				
black blueberry			x	x					
black swamp gooseberry						x	x		
blue elder						x	x		
choke cherry			x	x	x				
common juniper		x	x	x	x				
common rabbitbrush		x	x						
common saskatoon			x	x	x				
common snowberry					x	x			
creeping Oregon-grape				x	x				
glandular birch								x	
high bush cranberry						x	x		
mallow ninebark			x	x					
Oregon boxwood					x	x			
prairie sagebrush		x	x						
redstem ceanothus			x	x					
Rocky Mountain juniper				x	x				
Rocky Mountain maple					x	x			
snowbush ceanothus			x	x					
soopolallie			x	x	x				
twinberry honeysuckle					x	x			
Utah honeysuckle					x	x			
western birch							x		
western blue clematis					x				
western red-osier dogwood							x	x	
western thimbleberry					x	x			
willows					x	x	x		
HERBS									
American stinging nettle						x	x		
American vetch				x	x				
blue-bead clintonia						x			
bluebunch wheat grass		x	x						
brown-eyed Susan		x	x	x					
bulrush								x	
Canadian bunchberry					x	x			
clovers			x	x	x				
Columbia lily					x	x			
common cattail								x	x
common cow-parsnip						x	x		
common dandelion			x	x	x				
common horsetail						x	x	x	
common lady fern						x	x	x	
common mitrewort						x	x	x	
common silverweed						x	x		
common western pipsissewa					x				
cream-coloured peavine				x	x				
cucumberroot twistedstalk						x	x		

TABLE 4.3 (Continued)

Zone/Subzone: Interior Rocky Mountain Douglas-fir Zone/lodgepole pine subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	Very Xeric	Xeric	Subxeric	Submesic	Mesic	Subhygric	Hygric	Subhydric	Hydric
Plant Species									
HERBS (Continued)									
Douglas' aster				x	x				
drooping brome grass		x	x						
dwarf blueberry			x	x	x				
dwarf spike-rush								x	
early blue violet					x	x			
fairyslipper					x				
false Solomon's-seal					x	x			
few-flowered one-sided wintergreen					x	x			
few-flowered shooting star				x					
field mint						x	x		
field pussytoes				x	x				
fireweed				x	x	x			
green pyrola					x	x			
heart-leaved arnica				x	x	x			
Idaho fescue			x	x					
Indian paintbrush					x	x			
kinnikinnick			x	x	x				
lance-leaved stonecrop	x								
large-leaved rattlesnake orchid					x	x			
mountain sweetcicely					x	x			
northern twinflower					x	x			
northwestern sedge				x	x				
oak fern						x	x		
palmate colt's-foot						x	x		
pine grass				x	x	x			
prairie koeleria		x	x						
racemose pussytoes				x	x	x			
red baneberry						x	x		
Rocky Mountain ragwort					x	x			
rough fescue			x	x					
rough-fruited fairybells					x	x			
rough-leaved rice grass						x	x		
round-leaved alumroot		x	x						
rush							x	x	
sedges								x	x
selaginella	x	x							
showy aster			x	x	x	x			
silky lupine				x	x				
small-flowered blue-eyed Mary				x	x				
spiny shield fern						x	x		
spreading dogbane		x	x	x					
star-flowered false Solomon's-seal						x	x		
stiff club-moss						x	x		
sweet-scented bedstraw						x	x		
timber milk-vetch				x	x				
unifoliate-leaved foam-flower						x	x	x	
western meadow-rue					x	x	x		
western yarrow			x	x	x				
wild chive							x		
wild rye grass					x	x	x		
wild sarsaparilla						x	x		
wild strawberry				x	x				
wood-rush							x	x	
wood strawberry				x	x				
yellow salsify			x	x					

TABLE 4.4
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone/Subzone: Subalpine Engelmann spruce - alpine fir zone/Rocky Mountain Douglas-fir-lodgepole pine subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	**Very Xeric**	**Xeric**	**Subxeric**	**Submesic**	**Mesic**	**Subhygric**	**Hygric**	**Subhydric**	**Hydric**
Plant Species									
TREES									
alpine fir				x	x	x			
black cottonwood						x	x		
common paper birch					x	x			
Rocky Mountain Douglas-fir			x	x	x				
trembling aspen		x	x	x	x	x			
western larch				x	x	x			
western red cedar						x	x		
SHRUBS									
birch-leaved spirea				x	x				
black swamp gooseberry						x	x		
common juniper			x	x	x				
common saskatoon			x	x	x				
devil's-club						x	x		
Sitka mountain alder						x	x		
smooth Pacific menziesia					x	x			
soopolallie		x	x	x					
thin-leaved mountain alder					x	x	x		
twinberry honeysuckle					x	x	x		
Utah honeysuckle					x	x			
western red-osier dogwood						x	x		
willows				x	x	x	x		
HERBS AND DWARF SHRUBS									
Canadian bunchberry					x	x			
common cow-parsnip						x	x		
common horsetail						x	x	x	
common mitrewort						x	x	x	
common pink pyrola					x	x	x		
common western pipsissewa				x	x	x			
cream-coloured peavine				x	x				
cucumberroot twistedstalk					x	x			
dwarf blueberry			x	x					
dwarf scouring-rush					x	x	x		
false Solomon's-seal					x	x	x		
few-flowered one-sided wintergreen					x	x			
fireweed			x	x	x	x			
grouseberry			x	x	x				
heart-leaved arnica				x	x	x			
Hooker's fairybells					x	x			
kinnikinnick		x	x	x					
large-leaved rattlesnake orchid				x	x	x			
northern twinflower				x	x	x			
palmate colt's-foot						x	x		
pine grass				x	x	x			
red baneberry						x	x		
rough fescue		x	x						
rough-fruited fairybells						x	x		
rough-leaved rice grass						x	x		
round-leaved alumroot		x	x						
rush								x	x
sedges							x	x	x
silky lupine				x	x				
star-flowered false Solomon's-seal					x	x	x		
stiff club-moss						x	x		
sulphur hedysarum				x	x				
sweet-scented bedstraw					x	x			
unifoliate-leaved foam-flower						x	x	x	
western meadow-rue						x	x		
western mountainbells					x	x			
western yarrow			x	x	x				
wild rye grass					x	x	x		
wild strawberry				x	x				

TABLE 4.5
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone/Subzone: Subalpine Engelmann spruce-alpine fir zone/lodgepole pine-whitebark pine subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	**Very Xeric**	**Xeric**	**Subxeric**	**Submesic**	**Mesic**	**Subhygric**	**Hygric**	**Subhydric**	**Hydric**
Plant Species									
TREES									
alpine fir			x	x	x	x			
alpine larch			x	x	x				
black cottonwood						x	x		
Engelmann spruce			x	x	x	x	x		
lodgepole pine		x	x	x	x	x			
trembling aspen		x	x	x	x	x			
western larch				x	x				
whitebark pine			x	x	x				
SHRUBS									
black blueberry				x	x	x			
birch-leaved spirea			x	x					
black swamp gooseberry					x	x	x		
blue elder				x	x	x	x		
common juniper		x	x						
common Labrador tea						x	x	x	
devil's-club						x	x		
shrubby cinquefoil				x	x	x	x		
Sitka mountain alder					x	x	x		
Sitka mountain-ash					x	x			
smooth Pacific menziesia				x	x	x			
soopolallie		x	x	x					
thin-leaved mountain alder					x	x			
twinberry honeysuckle					x	x	x		
Utah honeysuckle				x	x	x			
western red-osier dogwood						x	x		
white-flowered rhododendron					x	x			
willows				x	x	x	x	x	
HERBS AND DWARF SHRUBS									
alpine blue grass			x	x	x				
alpine timothy			x	x	x	x			
American red blackberry					x	x			
arrow-leaved ragwort						x	x		
bear-grass			x	x					
black alpine sedge						x	x		
broad-leaved arnica				x	x				
Canadian bunchberry					x	x			
common cow-parsnip						x	x		
common horsetail						x	x		
common mitrewort						x	x		
common pink pyrola					x	x			
dwarf blueberry			x	x					
dwarf scouring-rush					x	x			
false Solomon's-seal				x	x	x	x		
few-flowered one-sided wintergreen				x	x	x	x		
fireweed			x	x	x	x			

TABLE 4.5 (Continued)

Zone/Subzone: Subalpine Engelmann spruce-alpine fir zone/lodgepole pine-whitebark pine subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	Very Xeric	Xeric	Subxeric	Submesic	Mesic	Subhygric	Hygric	Subhydric	Hydric
Plant Species									
HERBS AND DWARF SHRUBS (Continued)									
five-leaved creeping raspberry					x	x			
green false hellebore						x	x		
grouseberry			x	x	x				
heart-leaved arnica				x	x				
heart-leaved twayblade					x	x			
lance-leaved stonecrop		x	x						
large-leaved rattlesnake orchid				x	x	x			
mountain sweetcicely				x	x				
mountain vahlodea					x	x			
northern twinflower				x	x				
palmate colt's-foot						x	x		
pine grass			x	x					
red baneberry					x	x			
rough-leaved rice grass					x	x			
Sitka valerian				x	x	x			
spike trisetum			x	x					
subalpine fleabane						x	x		
sulphur hedysarum			x	x					
three-spot mariposa lily			x	x					
unifoliate-leaved foamflower					x	x	x		
western meadow-rue					x	x	x		
western mountainbells					x	x			
western pasqueflower						x	x		
western yarrow		x	x	x					
wild rye grass					x	x	x		
yellow glacier lily					x	x	x		

TABLE 4.6
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone/Subzone: Subalpine Engelmann spruce-alpine fir zone/krummholz subzone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	Very Xeric	Xeric	Subxeric	Submesic	Mesic	Subhygric	Hygric	Subhydric	Hydric
Plant Species									
TREES									
alpine fir			x	x	x	x			
alpine larch			x	x	x	x			
Engelmann spruce				x	x	x			
whitebark pine			x	x					
SHRUBS									
shrubby cinquefoil						x	x		
white-flowered rhododendron					x	x			
willows						x	x		
HERBS AND DWARF SHRUBS									
alpine blue grass			x	x					
alpine milk-vetch				x	x				
alpine timothy			x	x	x	x			
alpine willowherb					x	x	x		
American alpine smelowskia		x	x	x					
arrow-leaved ragwort					x	x	x		
black alpine sedge						x	x		
blue-leaved cinquefoil				x	x				
cream mountain-heather					x	x			
creeping sibbaldia				x	x	x			
goldenweed					x	x			
grouseberry			x	x	x				
Lyall's phacelia			x	x					
Merten's cassiope					x	x			
red mountain-heather				x	x	x			
Sitka valerian					x	x			
spike trisetum			x	x					
subalpine buttercup					x	x			
subalpine fleabane						x	x		
western pasqueflower						x	x		
white mountain-avens		x	x						
woolly pussytoes			x	x					
yellow glacier lily					x	x			

TABLE 4.7
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone: Alpine tundra zone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	Very Xeric	Xeric	Subxeric	Submesic	Mesic	Subhygric	Hygric	Subhydric	Hydric
Plant Species									
SHRUBS									
willow				x	x	x	x		
HERBS									
alpine blue grass				x	x				
alpine timothy				x	x	x			
alpine willowherb			x	x					
American alpine smelowskia			x	x					
black alpine sedge						x	x		
blue-leaved cinquefoil				x	x				
broad-leaved willowherb					x	x			
creeping sibbaldia				x	x	x			
Lyall's phacelia			x	x	x				
moss campion		x	x	x					
mountain forget-me-not				x	x	x			
Sitka valerian					x	x			
western pasqueflower					x	x			
white mountain-avens		x	x	x					

TABLE 4.8
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone: Interior western hemlock-western red cedar zone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	**Very Xeric**	**Xeric**	**Subxeric**	**Submesic**	**Mesic**	**Subhygric**	**Hygric**	**Subhydric**	**Hydric**
Plant Species									
TREES									
alpine fir					x	x			
black cottonwood						x	x		
common paper birch				x	x	x			
Engelmann spruce					x	x	x		
lodgepole pine			x	x	x				
Rocky Mountain Douglas-fir			x	x	x				
western hemlock				x	x	x			
western larch				x	x	x			
western red cedar			x	x	x	x	x		
white pine			x	x	x				
SHRUBS									
birch-leaved spirea			x	x	x				
black blueberry				x	x				
devil's-club						x	x		
Oregon boxwood				x	x	x			
Rocky Mountain maple				x	x				
smooth Pacific menziesia					x	x			
twinberry honeysuckle					x	x			
Utah honeysuckle				x	x	x			
western red-osier dogwood						x	x		
western thimbleberry					x	x			
western yew					x	x			
HERBS AND DWARF SHRUBS									
blue-bead clintonia					x	x			
Canadian bunchberry					x	x			
common lady fern						x	x		
common pink pyrola					x	x	x		
common western pipsissewa				x	x				
cucumberroot twistedstalk					x	x	x		
false Solomon's-seal					x	x			
few-flowered one-sided wintergreen				x	x	x			
fireweed			x	x	x	x	x		
heart-leaved arnica				x	x				
Hooker's fairybells					x	x			
kinnikinnick			x	x					
large-leaved rattlesnake orchid				x	x	x			
mountain sweetcicely				x	x	x			
northern twinflower				x	x				
oak fern					x	x			
one-flowered wintergreen					x				
pine grass			x	x					
red baneberry					x	x	x		
rough-fruited fairybells					x	x			
spiny shield fern						x	x		
star-flowered false Solomon's-seal				x	x	x	x		
stiff club-moss						x	x		
sweet-scented bedstraw					x	x			
unifoliate-leaved foam-flower					x	x	x		
wild sarsaparilla					x	x			

TABLE 4.9
SPECIES AND THEIR MOISTURE REQUIREMENTS

Zone: Interior western red cedar zone

Soil Drainage	Very Rapid to Rapid			Well to Moderately Well			Imperfect	Poor	Very Poor
Moisture Regime	Very Xeric	Xeric	Subxeric	Submesic	Mesic	Subhygric	Hygric	Subhydric	Hydric
Plant Species									
TREES									
alpine fir				x	x	x			
black cottonwood						x	x		
common paper birch					x	x			
Engelmann spruce					x	x	x		
lodgepole pine			x	x	x				
Rocky Mountain Douglas-fir			x	x	x				
western red cedar				x	x	x	x		
SHRUBS									
birch-leaved spirea			x	x	x				
devil's-club						x	x		
Oregon boxwood				x	x	x			
Rocky Mountain maple				x	x	x			
western red-osier dogwood						x	x		
western thimbleberry				x	x	x			
HERBS AND DWARF SHRUBS									
blue-bead clintonia					x	x			
Canadian bunchberry					x	x			
common lady fern						x	x		
common pink pyrola					x	x	x		
common western pipsissewa				x	x				
cucumberroot twistedstalk					x	x			
false Solomon's-seal				x	x	x			
few-flowered one-sided wintergreen				x	x	x			
fireweed			x	x	x	x			
heart-leaved arnica				x	x	x			
Hooker's fairybells					x	x			
kinnikinnick			x	x					
large-leaved rattlesnake orchid				x	x	x			
mountain sweetcicely				x	x	x	x		
northern twinflower				x	x				
oak fern					x	x			
pine grass			x	x					
red baneberry						x	x		
rough-fruited fairybells					x	x			
star-flowered false Solomon's-seal					x	x			
stiff club-moss						x	x		
sweet-scented bedstraw					x	x			
unifoliate-leaved foam-flower					x	x	x		
western meadow-rue					x	x	x		
wild sarsaparilla						x	x		

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APPENDIX A

DESCRIPTION OF CATEGORIES USED IN VEGETATION TYPE TABLES

The following is a description of what information is available in the Vegetation Type Tables in Section 2.2. The tables present descriptions of the typical vegetation for each type and the range of environmental factors under which the type occurs.

Vegetation Characteristics

Region: A Forest Region is an area over which the patterns of Forest Zones are a reflection of the regional climate. Forest Regions for the study area are described in Volume One and include the Dry Interior Region and the Interior Wet Belt Region. These Regions are presented in a map in Volume One.

Section: A Section or Forest Section is an area, within a Forest Region, defined by a specific pattern of Forest Zones and/or subzones reflecting a specific regional variation in the climate. Forest Sections for the study area are described in Volume One. Sections are presented in a map in Volume One.

Zone: A Zone or Forest Zone is an area of the landscape in which, on sites of similar soil and topographic conditions, the dominant (actual or potential) vegetation of the climax stands is identical. Forest Zones for the Study Area are described in Volume One and are available in a 1:50 000 scale of maps from the Terrestrial Studies Branch.

Subzone: A Subzone or Forest Subzone is an area within a Forest Zone defined on the basis of climate related successional trends of the dominant vegetation on representative sites or climate related differences in growth form of the dominant vegetation. Forest Subzones are described in Volume One and are available in a 1:50 000 scale of maps from the Terrestrial Studies Branch.

Successional stage: The following categories are recognized. More comprehensive definition may be found in Ministry of Environment and Ministry of Forests (1980).

a) pioneer seral - disturbance has been severe enough to inhibit usual successional stages and a distinct vegetation is 'pioneering' on the site.

b) young seral - usual successional stage, generally younger than sixty years old.

c) maturing seral - usual successional stage generally between sixty and one hundred and forty years old. Both climax and seral species are usually present.

d) overmature seral - usual successional stage, generally older than one hundred and forty years old. Climax species may dominate or the overmature seral species are distinctly decadent as evident from dead tops and disease agents present.

e) climatic climax vegetation - the climax community found on typical well-drained soils. Vegetation generally reflects the climate of an area. Young climatic climax vegetation is generally less than sixty years old; maturing climatic climax vegetation has acquired the structure and composition of mature stands. This vegetation is generally more than sixty years old.

f) edaphic climax vegetation - the climax vegetation which more directly reflects site conditions such as extreme soil characteristics or a topographic position which causes the climax plant communities to differ from the climatic climax. Young edaphic climax vegetation is generally less than sixty years old; maturing edaphic climax vegetation has acquired the structure and composition of mature communities. The vegetation is generally more than sixty years old.

Stand Appearance: Stand appearance is the structure and appearance of the vegetation regardless of the species of which it is composed. It includes:

Forested Areas

coniferous forested dense	Tree crowns cover more than 50% of the area and less than 1/10 of the crown coverage is provided by broadleaved trees.
coniferous forested open	Tree crowns cover between 25% and 50% of the area and less than 1/10 of the crown coverage is provided by broadleaved trees.
coniferous forested parkland	Tree crowns cover between 1% and 25% of the area and less than 1/10 of the crown coverage is provided by broadleaved trees.
broadleaved forested dense	Tree crowns cover more than 50% of the area and less than 1/10 of the crown coverage is provided by coniferous trees.
broadleaved forested open	Tree crowns cover between 25% and 50% of the area and less than 1/10 of the crown coverage is provided by coniferous trees.

broadleaved forested parkland	Tree crowns cover between 1% and 25% of the area and less than 1/10 of the crown coverage is provided by coniferous trees.
mixed forested dense	Tree crowns cover more than 50% of the area and coniferous and broadleaved trees each provide more than 1/10 of the total crown coverage.
mixed forested open	Tree crowns cover between 25% and 50% of the area and coniferous and broadleaved trees each provide more than 1/10 of the total crown coverage.
mixed forested parkland	Tree crowns cover between 1% and 25% of the area and coniferous and broadleaved trees each provide more than 1/10 of the total crown coverage.

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Non-forested Areas

alpine tundra	Treeless area dominated by cold-resistant vegetation consisting of low-matted shrubs, herbs and lichens adapted to complete their reproductive cycle in short growing seasons.
krummholz	Area in which, in response to severe and fluctuating climatic conditions, subalpine tree species occur in stunted and layered forms as scattered individuals, in clumps (tree islands), or in discontinuous coverage with the non-treed areas dominated by herbs, lichens, and/or shrubs.
meadow	Treeless area dominated by herbaceous plants in response to improved moisture conditions (in relation to the general climate) from snowmelt, seepage and/or high water tables for at least part of the year.
nonvegetated	Areas mostly devoid of vegetation other than that involved in the initial breakdown of rock and rock particles (certain lichens and mosses); areas may be bedrock, talus, glaciers, gravel pits, and other recently disturbed surfaces.
pioneer undifferentiated	Treeless area dominated by shrubs or herbs prior to establishment of seral tree species. Vegetation is not specified.
pioneer herb	Treeless area dominated by herbs prior to establishment of seral tree species. This pioneer community may represent an early stage in succession to forest communities or it may represent herb communities on recent surficial deposits.
pioneer shrub	Treeless area dominated by shrubs. This pioneer community may represent an early stage in succession to forest communities or shrub communities on recent surficial deposits (including those subject to periodic disturbance such as avalanches and floodplains).
recently logged	Areas mostly devoid of vegetation because of recent logging (and possible subsequent slash burning and scarification); usually remnants of previous vegetation remain.
savannah	Areas virtually devoid of trees (less than 1% of crown cover) and dominated by drought-tolerant shrubs, with herbs and grasses forming the understory.
steppe	Areas virtually devoid of trees and shrubs (less than 1% of crown cover respectively) and dominated by drought-tolerant grasses and herbs.
wetland undifferentiated	Marshes, swamps, fens, bogs, or inundated areas with emergent wetland vegetation, for which vegetation is not specified.
wetland bog	Areas with organic substrate covered by ombrotrophic (mineral-poor, rain-fed) mosses (usually sphagnums), with or without trees.

wetland fen	Areas with organic substrate covered by minerotrophic (mineral-rich, groundwater-fed) sedges. Water table reaches up to the surface at some part of the year.
wetland marsh	Areas with mineral substrate (often with a thin surface of muck) inundated for significant portions of the year, supporting herbaceous vegetation.
wetland swamp	Areas with mineral substrate (often with a thin surface of muck) inundated for significant portions of the year, supporting woody vegetation which is dominant over the herbaceous vegetation.

SPECIES COMPOSITION

The percentage values given are typical values for the type. Dominants are those species that dominate each layer. They are usually characteristic of the type. Associates are those species that are not always present in the type but are frequently found. Botanical names are given for each species in Appendix B.

Tree layer: The structural layer of a vegetation stand that includes tree species generally taller than 10 m.

Tall shrub layer: The structural layer of a vegetation stand that includes all shrubs and tree regeneration between 2 m and 10 m in height.

Low shrub layer: The structural layer of a vegetation stand that includes all shrubs (except dwarf shrubs) and tree regeneration under 2 m in height.

Herb layer: The structural layer in a vegetation stand composed of all herbaceous plants and dwarf shrubs growing on the dominant substrate.

Moss, lichen and liverwort layer: The structural layer in a vegetaion stand that contains all mosses, lichens and liverworts that grow on the dominant substrate.

Character Species: The Character Species are the species used to differentiate a type from similar types with which it may be confused. Character Species listed as Present are lacking from similar types while those listed as Absent are lacking from the type but are present in similar types of a particular Broad Group.

TERRAIN AND SOILS

Terrain: Information given in this category includes: position in the terrain, depth of material and the kinds of parent material on which the type is found. Parent material is the unaltered, or essentially unaltered, mineral or organic material in which a soil develops through the operation of soil-forming processes (see E.L.U.C. Secretariat, 1976).

Soil Texture: The relative proportions of the various soil particle size components (clay, silt and sand) with soil materials. The following soil texture classes are recognized (Agriculture Canada, 1978):

coarse texture:	sand
	loamy sand
	sandy loam
medium texture:	loam
	silt loam
	silt
moderately fine texture:	silty clay loam
fine texture:	sandy clay loam
	clay loam
	sandy clay
	silty clay
	clay
	heavy clay

Soil Association comp (components): A soil association is a group of soils that occurs associated in the landscape based on similarities in climatic or physiographic factors, soil parent materials and vegetation zonation. Components are differentiated on the basis of relief, drainage, texture or other characteristics. Those soil association components listed are described in Lacelle (in preparation) and are mapped by Lacelle (1979). When it is indicated that a 'wide range' of soils is associated with a type, the soil association components are listed in Volume Two, Chapter Two of this report.

Moisture Regime: The moisture regime of an area is a class of a relative scale of moisture available for plant growth that applies within the climatic regime of a forest subzone. From driest to wettest the classes are (see Ministry of Environment and Ministry of Forests, 1980):

xeric - very dry

- subxeric
- submesic
- mesic - average
- subhygric
- hygric
- subhydric
- hydric - very wet

Drainage: The following classes are used (C.S.S.C., 1978):

- rapidly drained
- well drained
- moderately well drained
- imperfectly drained
- poorly drained
- very poorly drained

Topography:

Elevation: in metres

Slope: in percentage

Aspect: in degrees

Landscape position: This refers to which segment of the surface of the landscape a type is found. Categories include (Ministry of Environment and Ministry of Forests, 1980):

- upper slope
- middle slope
- lower slope
- valley floor
- plain

Ecology: This refers to those characteristics of the environment which allows the particular vegetation type to occur. It includes consideration of: moisture and nutrient availability and cycling, length of growing season, temperature, precipitation, soil, aspect, plant competition and other significant factors.

Succession: Succession is the progressive development of vegetation to a stable endpoint (climax) following a disturbance which has destroyed all or part of the existing vegetation. Factors considered for this category include: the rate of succession and which environmental factors cause the rate to be slower or faster than normal for the climatic environment, whether the vegetation leads to an edaphic climax and how typical the vegetation is for a subzone. Many of the Vegetation Types can be related to the tables of Successional Trends which are in Volume One, Chapter Three. A Succession Sequence Number is listed in the succession box. These numbers correspond to the particular successional sequence in Volume One.

APPENDIX B

SOIL ASSOCIATION COMPONENT - VEGETATION TYPE TABLES

Vegetation types associated with each of the soil association components[2] are listed in tables B.1 to B.7. For soil association components for which vegetation data was not obtained vegetation types were determined by extrapolation from available data, where possible. These extrapolated types are represented by numbers in parentheses (e.g. (43)). Blanks occur where extrapolation was not possible. Only those soil association components that were mapped in significant amounts are tabulated. Other association names and symbols may appear in other tables of this report. For description of soil associations see Lacelle (in preparation). For descriptions of the Vegetation Types see Volume Three of this report.

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[1] Reliability of vegetation type mapping is discussed in Ferster (1976, unpublished manuscript).

[2] For descriptions of the soil association see Biophysical Resources of the East Kootenay area (Lacelle, in preparation).

TABLE B.1

SOIL ASSOCIATION COMPONENTS AND THEIR ASSOCIATED VEGETATION TYPES FOR THE PONDEROSA PINE SUBZONE AND THE WESTERN LARCH - PONDEROSA PINE SUBZONE OF THE INTERIOR ROCKY MOUNTAIN DOUGLAS-FIR ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Colin Creek (COL)	COL_1	100	78, 82, 96, 100, 103
	COL_2		103, (105)
	COL_7	67	67, 97
Elko (E)	E_1	84, 100	79, 83, 96, 97, 98, 100, 102, 103, 107, 110, (85, 103, 108)
	E_2		78, 98, (104, 105, 107)
	E_4		103
	E_9		
Fishertown (FX)	FX_1	81, 84, 85, 100	79, 85, 91, 96, 98, 99, 100, 101, 103, 108, 117
	FX_2		96, 97, 98 (104, 105, 107)
	FX_9		
Flagstone (F)	F_1	85	85, 89, 102, 103, 110
	F_2	100	100, (104, 105, 107)
Fort Steele (FS)	FS_1	(67)	(67, 71, 72, 77, 95)
	FS_3		
	FS_{10}		
Hyak (H)	H_1		
	H_3		
	H_7		
Kayook (KY)	KY_1		(78, 79, 82, 83, 85, 94, 96, 100, 102, 103, 108, 109)
	KY_2		(104, 105, 107)
	KY_4	85	85
	KY_9		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.1 (Continued)
PONDEROSA PINE SUBZONE AND WESTERN LARCH - PONDEROSA PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Kinbasket (K)	K_1		79, 83, 87, 103
	K_2		(109)
	K_3		88, (42, 79)
	K_5		(103, 109)
Kokum (KO)	KO_1		(79, 83, 96, 97, 98, 100, 102, 103, 107, 110)
	KO_2		(104, 105, 107)
	KO_3		
	KO_{10}	(67)	(71, 72, 77, 95)
	KO_{11}		
Lakit (L)	L_1		(79, 83, 96, 97, 98, 100, 102, 103, 107, 110)
	L_2		(104, 105, 107)
	L_{10}	(67)	(71, 72, 77, 95)
	L_{11}		(71, 95)
Mayook (M)	M_1	72, 80, 106	72, 79, 80, 89, 94, 109, (101, 120)
	M_2		98, 101, 120, (117)
	M_4		98
	M_{10}		
Olivia (OL)	OL_1	72, 122, (127)	72
Plumbob (P)	P_1		109
	P_3		(97, 103, 117)
	P_5		(109, 117)
	P_{10}		105, (104)
	P_{11}		
Rockbluff (RB)	RB_1		(99, 100, 103, 107, 110, 117)
	RB_2		(105)

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.1 (Continued)
PONDEROSA PINE SUBZONE AND WESTERN LARCH - PONDEROSA PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Rockbluff (cont'd)	RB_4		96, 118
	RB_5		96, 103, 136
	RB_7		
Saha (SA)	SA_1		(104, 105, 107)
	SA_3		
	SA_9		
	SA_{10}		103, 105, 107
	SA_{11}		
Salishan (S)	S_1	67	67, 77, 95
	S_2		71
	S_3	72	71, 72
	S_{10}	72	72, 95, (71)
	S_{11}	75, 76	72, 75, 76, 95, (71)
Wycliffe (WY)	WY_1		78, 79, 82, 83, 85, 94, 96, 100, 102, 103, 108, 109, (93, 99, 119)
	WY_2		96, 97, 102, (104, 105)
	WY_4		97
	WY_5		96, (97)

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE 8.2
SOIL ASSOCIATION COMPONENTS AND THEIR ASSOCIATED VEGETATION TYPES FOR THE LODGEPOLE PINE SUBZONE OF THE INTERIOR ROCKY MOUNTAIN DOUGLAS-FIR ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Abruzzi (AZ)	AZ_1	67	22, 44, 61, 66, 67, 83, 94
	AZ_2	68	38, 42, 74
	AZ_3		44, 74
	AZ_7		
Big Fish (BF)	BF_1		(78, 80, 92, 93, 99, 100)
	BF_2		(90)
	BF_5	100	100
	BF_6	80	80
	BF_7		
Cadorna (CA)	CA_1		(44, 69, 121)
	CA_2		
	CA_3		
	CA_4		
	CA_7		
Caithness (CAI)	CAI_1	69, 84, 100	69, 100, (78, 82, 103)
	CAI_2	85	85
	CAI_7	100	42, 100, (97)
Cedrus (CD)	CD_1	(81)	59, 66, (42, 79)
	CD_2		42, 55
	CD_3		42, 64, 66
	CD_4		
	CD_5		
Cervil (CR)	CR_1	67, 80, 81, 85	42, 44, 67, 78, 80, 85, (43, 83, 93, 94, 99, 119)
	CR_2		
	CR_7		42, 43, (87, 97)

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.2 (Continued)
LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Coal Creek (CC)	CC_1		(42, 44, 67)
	CC_2		
	CC_4		42, 48
	CC_7		
Cochras (CK)	CK_1		(44, 58, 69)
	CK_3		
	CK_7		
Cokato (CO)	CO_1	(81)	(42, 44, 58, 59)
	CO_2		
	CO_3	68	
	CO_4		42, 44
	CO_5		(87)
Cold Creek (CLD)	CLD_1		41, 42, 44, 46, (69, 78, 82)
	CLD_7		(97, 100)
Cornwell (COR)	COR_1		(44, 69)
	COR_7		(51)
Crowsnest (CN)	CN_1	69, 70	69, (70, 71, 72, 77, 113)
	CN_3		
	CN_{10}	69	69
	CN_{11}		
Cummings (CG)	CG_1		44, (69, 121)
	CG_2		
	CG_7		51, 135
Fireweed (FF)	FF_1	72, 125	72, 73, 76 (70, 71, 77, 113)
	FF_3	67	67, 77
	FF_{10}		
	FF_{11}		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.2 (Continued)
LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Flatbow (FL)	FL$_1$	(81)	42, 44, 79, (57, 83, 88)
	FL$_2$		41, 89
	FL$_4$		(43, 78, 80, 93, 94, 119)
Glen Cairn (GN)	GN$_1$	69	19, 41, 42, 53, 56, 69, 79, 103, 114, (57, 58, 66, 87)
	GN$_3$		62, (64)
	GN$_4$		44
	GN$_{10}$	68	75, (70, 71, 72, 73, 77, 113)
Grundle (GR)	GR$_1$	67	42, 43, 44, 57, 67, 79, (58, 66, 69, 87, 121)
	GR$_2$		
	GR$_3$		44
	GR$_4$		
Keeney (KE)	KE$_1$	69, 100, 106	40, 42, 59, 63, 67, 69, 77, 78, 79, 83, 87, 91, 93, 96, 100, 104, (41, 43, 58, 66, 87)
	KE$_2$		97, 137, 138
	KE$_3$		(52, 53)
	KE$_4$		42
	KE$_7$		
Madias (MA)	MA$_1$		61, 94
	MA$_2$	54	44, 54, 55, 61, 63, 94, 95
	MA$_3$		61
	MA$_7$	76	66, 76
	MA$_{10}$	113, 123, 124	
Malpass (MS)	MS$_1$	86, (81)	57, 83, 87, 88, (42, 79)
	MS$_2$	86	41
	MS$_4$	86	42, 46, 89
	MS$_5$		(87)

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.2 (Continued)
LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Mansfield (MF)	MF_1	(80, 81, 106)	(78, 80, 83, 93, 94)
	MF_2		
	MF_5		
Marmalade (MD)	MD_1	80, 81, 106, 115	42, 43, 78, 80, 83, 93, 94, 99, 119
	MD_2		(111)
	MD_3		60
	MD_4		(42, 57, 83, 88)
	MD_5		91
Michel (MY)	MY_1	67	67, 89, 94, (41, 43, 58, 59, 63, 66, 79, 87, 91)
	MY_2		111
	MY_3		
	MY_4	67	59, 67
	MY_7		
Murdock (MZ)	MZ_1	(80, 81)	(42, 57, 58, 59, 83, 88)
	MZ_2		(41)
	MZ_3		58, 63
	MZ_5		
Nowitka (NW)	NW_1	(127)	(71)
	NW_2		
	NW_3		
	NW_{11}		
Olsonite (OS)	OS_1	70, 127	
	OS_{11}		
River Run (RI)	RI_1		(78, 80, 92, 93, 99, 100)
	RI_2		(90)
	RI_3		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.2 (Continued)
LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
River Run (cont'd)	RI_4		
	RI_5		
	RI_6		
	RI_7		
Robert Creek (RC)	RC_1		(44, 69, 78, 80, 92, 93, 99, 100, 121)
	RC_2		(90)
	RC_5		
	RC_6		
	RC_7		
Rock Cleft (RE)	RE_1		(42, 44, 67, 121)
	RE_2		
	RE_4		
	RE_5		
	RE_6		
	RE_7		
Rosen (RS)	RS_1		(78, 80, 93, 99, 100)
	RS_2		(90)
	RS_5		79
	RS_6		
	RS_7		
Round Prairie (RP)	RP_1		(44, 69, 78, 80, 92, 93, 99, 100, 121)
	RP_2		(90)
	RP_5		
	RP_6		
	RP_7		

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[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.2 (Continued)
LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Ryanier (RY)	RY_1		(78, 80, 93, 99, 100)
	RY_3		(90)
	RY_5		
	RY_6		78
	RY_7		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.3
SOIL ASSOCIATION COMPONENTS AND THEIR ASSOCIATED VEGETATION TYPES FOR THE INTERIOR WESTERN HEMLOCK - WESTERN RED CEDAR ZONE AND THE INTERIOR WESTERN RED CEDAR ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Avis (AS)	AS_1	(127)	67, 75, (74, 113)
	AS_3		
	AS_9		
	AS_{10}		
	AS_{11}		38
Bohan Creek (BK)	BK_1		(42, 44, 69, 121)
	BK_5		44
	BK_6		
Buhl Creek (BH)	BH_1		(42, 44, 69, 121)
	BH_5		
	BH_6		
Burton Creek (BN)	BN_1		(36, 37, 44, 69, 121)
	BN_5		
	BN_6		
Calamity (CL)	CL_1	9	9, (15, 38, 44, 69, 121)
	CL_2		15, 38, 44
	CL_7		
	CL_8		(13, 128)
Cayuse (CE)	CE_1		(38, 44, 68, 69, 121)
	CE_3		
	CE_4		44
	CE_7		
	CE_8		(13, 128)
Cooper (CP)	CP_1	(9)	(9, 15, 38, 39, 44, 68, 69, 121)

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.3 (Continued)
INTERIOR WESTERN HEMLOCK - WESTERN RED CEDAR ZONE AND INTERIOR WESTERN RED CEDAR ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Fletcher (FR)	FR$_1$	(68)	(36, 37, 38, 39, 44, 68, 69, 121)
	FR$_2$		
	FR$_3$		38
	FR$_4$		
	FR$_{10}$		
Fruitvale (FT)	FT$_1$	(68)	(36, 37, 38, 39, 44, 68, 69, 121)
	FT$_2$		
	FT$_3$		
	FT$_7$		
	FT$_8$	(13, 129)	
	FT$_{10}$		
Glenlily (GY)	GY$_1$		(26, 28, 32, 35, 38, 50)
	GY$_2$		
	GY$_3$		
Kaslo (KA)	KA$_1$		(26, 28, 32, 35, 37, 38, 39, 50)
	KA$_2$		46
	KA$_3$		
	KA$_4$		
	KA$_7$		
	KA$_8$	(13, 129)	
Kinert (KR)	KR$_1$	(68)	(38, 44, 68, 69, 121)
	KR$_2$		
	KR$_3$		
	KR$_4$		41
Lawley (LY)	LY$_1$		44, 46, (38, 68, 69, 121)
	LY$_2$		41, 43
	LY$_3$		

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[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.3 (Continued)
INTERIOR WESTERN HEMLOCK - WESTERN RED CEDAR ZONE AND INTERIOR WESTERN RED CEDAR ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Lawley (cont'd)	LY_4		41
	LY_7		
Sentinel (SL)	SL_1		(38, 44, 50, 69, 121)
	SL_5		
Shields (SS)	SS_1		(38, 44, 50, 69, 121)
	SS_2		
	SS_4		
	SS_5		
Skelly (SY)	SY_1		41, 60, (38, 44, 68, 69, 121)
	SY_2		
	SY_3		38, 39
	SY_4		
	SY_5		
Ymir (YR)	YR_1		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4
SOIL ASSOCIATION COMPONENTS AND THEIR ASSOCIATED VEGETATION TYPES FOR THE ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE OF THE SUBALPINE ENGELMANN SPRUCE - ALPINE FIR ZONE AND INTERIOR WET BELT REGION SUBALPINE AREAS

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Badshot (BS)	BS$_1$		19, (17, 21, 35, 43, 46, 60, 61, 62, 85, 90)
	BS$_2$		
	BS$_3$		
	BS$_5$	85	85
	BS$_6$	85	20, 56, 85
	BS$_7$		90
	BS$_8$	(13, 128, 129)	
Bohan Creek (BK)	BK$_1$		(42, 44, 69, 121)
	BK$_5$		44
	BK$_6$		
Brennan (BB)	BB$_1$		51, (17, 19, 21, 35, 43, 46, 60, 61, 62, 85, 90)
	BB$_2$		
	BB$_3$		
	BB$_5$	8	8
	BB$_6$		55
	BB$_7$		
	BB$_8$	(13, 128)	
Buhl Creek (BH)	BH$_1$		(42, 44, 69, 121)
	BH$_2$		
	BH$_6$		
Calamity (CL)	CL$_1$	9	9, (15, 38, 44, 69, 121)
	CL$_2$		15, 38, 44
	CL$_7$		
	CL$_8$	(13, 128)	

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4 (Continued)
ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Calderol (CJ)	CJ_1	37, 100	15, 36, 37, 39, 41, 42, 44, 100
	CJ_7		
	CJ_8	(13, 128)	
Cooper (CP)	CP_1		(9, 15, 38, 44, 69, 121)
Corbin (CX)	CX_1	12	12, 27, (42, 44)
	CX_2		
	CX_3		
	CX_4		
	CX_7		
	CX_8	(13, 128)	
Coubrey (CB)	CB_1	27, 29, 39	27, 29, 39, 44
	CB_2		19
	CB_3		49
	CB_7	76	20, 76
	CB_8	(13, 128)	
Couldron (CW)	CW_1	30, 47	28, 29, 30, 34, 35, 39, 41, 47, 48, 54, 121
	CW_2		44
	CW_3	25	23, 25, 36, 57
	CW_4	12	12, 15
	CW_7		45
	CW_8	(13, 128)	
Coulotte (CU)	CU_1		35, (28, 29, 30, 34, 47, 48)
	CU_7		
	CU_8	(13, 128)	
Courcelette (CT)	CT_1		29, (47, 65)
	CT_2		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4 (Continued)
ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Courcelette (cont'd)	CT_3		
	CT_4		57
	CT_7		29, 60, 94
	CT_8	(13, 128, 129)	
Fadeway (FD)	FD_1		64, (74, 75, 76, 112)
	FD_3		
	FD_{10}		
	FD_{11}		
Fenwick (FP)	FP_1	(68)	(55, 61, 63, 64)
	FP_2		64
	FP_3		
	FP_4	68	61
	FP_7		
	FP_8	(13, 129)	
Follock (FA)	FA_1		(75, 76, 112)
	FA_3		
	FA_{10}		
	FA_{11}		
Four Points (FU)	FU_1	33	17, 75, (74, 76, 112)
	FU_3	33, 75, 76	34, 56, 57, 73, 75, 76
	FU_{10}		
	FU_{11}		
Fox Lake (FZ)	FZ_1	75, 77	17, 75, 77, (74, 76, 112)
	FZ_3		
	FZ_{10}		
	FZ_{11}		
Frayn Mountain (FM)	FM_1		(74, 75, 76, 77, 112)

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4 (Continued)
ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Frayn Mountain (cont'd)	FM$_3$		
	FM$_9$		
	FM$_{10}$		
	FM$_{11}$		
Frontal (FO)	FO$_1$		(18, 44, 64, 75, 76)
	FO$_3$		(73, 112)
	FO$_4$	76	26, 76
	FO$_7$		
	FO$_8$	(13, 129)	
	FO$_9$		
Fruitvale (FT)	FT$_1$	(68)	(36, 37, 38, 39, 44, 68, 69, 121)
	FT$_2$		
	FT$_3$		
	FT$_7$		
	FT$_8$	(13, 129)	
	FT$_{10}$		
Gagnebin (GB)	GB$_1$	47	34, 40, 43, 45, 47, 48, 60, (46, 49, 52, 53)
	GB$_2$		
	GB$_3$	30	21, 30, 57
	GB$_4$		50
	GB$_7$		
	GB$_8$	(13, 129)	
Galton (GT)	GT$_1$		44, (42, 43, 48, 52, 57, 58, 59, 61, 65, 66)
	GT$_2$		44
	GT$_3$		
	GT$_4$		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4 (Continued)
ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Galton (cont'd)	GT$_7$		
	GT$_8$	(13, 129)	
Goodum (GD)	GD$_1$		34, 44, 51, 55, 56, 59, 62, 79, (42, 43, 48, 52, 57, 58, 61, 65, 66)
	GD$_2$		58
	GD$_3$		
	GD$_4$		
	GD$_7$		
	GD$_8$	(13, 129)	
Kaslo (KA)	KA$_1$		(26, 28, 32, 35, 37, 38, 39, 50)
	KA$_2$		15, 46
	KA$_3$		
	KA$_4$		22
	KA$_7$		
	KA$_8$	(13, 129)	
Lancaster (LN)	LN$_1$		35, 53, 65, (29, 31, 47, 64, 75, 76)
	LN$_2$		66
	LN$_3$		34
	LN$_4$		39, 55, 60, 65
	LN$_7$		
	LN$_8$	(13, 129)	
Maiyuk (MU)	MU$_1$		38, 50, (44, 69, 121)
	MU$_3$		52
	MU$_5$		22, 44
	MU$_7$		
	MU$_8$	(13, 128, 129)	

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4 (Continued)
ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Matkin (MK)	MK$_1$		42, 44
	MK$_3$		
	MK$_4$		39, 42
	MK$_5$		
	MK$_7$		
	MK$_8$	(13, 128, 129)	
McLatchie (MT)	MT$_1$		43, 48, 51, (57, 58, 59)
	MT$_3$		
	MT$_4$		15, 22
	MT$_5$		
	MT$_7$		
	MT$_8$	(13, 128, 129)	
Morrissette (MO)	MO$_1$		26, 35, 44, (28, 31, 55)
	MO$_3$	(30)	(9, 12)
	MO$_4$		53
	MO$_5$		
	MO$_7$		
	MO$_8$	(13, 128, 129)	
Moscliffe (MW)	MW$_1$	47	44, 47, (25, 29, 69)
	MW$_3$		
	MW$_4$		
	MW$_5$		
	MW$_7$		
	MW$_8$	(13, 128, 129)	65
Mount Mike (MM)	MM$_1$	30, 47	19, 30, 42, 44, 47, 56, 65
	MM$_2$		21
	MM$_3$		43

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4 (Continued)
ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Mount Mike (cont'd)	MM_4		47, 66
	MM_5		
	MM_7		
	MM_8		
O'Neill (ON)	ON_1	(70, 127)	
	ON_{11}		
Racehorse (RR)	RR_1		15, (22, 28, 53)
	RR_2		
	RR_3		
	RR_4		
	RR_5		
	RR_6		92
	RR_7		
	RR_8	(13, 128)	
Ridge Range (RD)	RD_1		(17, 19, 21, 35, 43, 46, 60, 61, 62, 85, 90)
	RD_2		
	RD_3		
	RD_5		
	RD_6		
	RD_7		
	RD_8	(13, 128)	
Roche Mountain (RH)	RH_1	37, 84	37, (17, 19, 21, 35, 43, 46, 60, 61, 62, 85, 90)
	RH_2		
	RH_3		35
	RH_4		
	RH_5	100	89, 90, 96, 100, 103

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.4 (Continued)
ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Roche Mountain (cont'd)	RH_6		
	RH_7	81	44
	RH_8	(13, 128)	
Russette (RU)	RU_1		(62, 81, 82, 92)
	RU_2		
	RU_3		
	RU_4		
	RU_5		
	RU_6		
	RU_7		
	RU_8	(13, 128)	
Sentinel (SL)	SL_1		(38, 44, 50, 69, 121)
	SL_5		
Shields (SS)	SS_1		(38, 44, 50, 69, 121)
	SS_2		
	SS_4		
	SS_5		
Spillmacheen (SP)	SP_1	47	17, 19, 21, 42, 44, 47, 48, 52
	SP_3		20, 34, 42, 45, 53, 65
	SP_4		93
	SP_5		
	SP_7		
	SP_8	(13, 128)	
Yahk Creek (YK)	YK_1	1	
	YK_9		
	YK_{10}		
	YK_{11}		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.5
SOIL ASSOCIATION COMPONENTS AND THEIR ASSOCIATED VEGETATION TYPES FOR THE LODGEPOLE PINE - WHITEBARK PINE SUBZONE OF THE SUBALPINE ENGELMANN SPRUCE - ALPINE FIR ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Beatrice (BC)	BC_1		(3, 5, 8, 9, 15, 16, 17, 19, 32, 35, 90, 92)
	BC_2		
	BC_5		
	BC_6		
	BC_7		
	BC_8	(13, 128)	
Bonner (BO)	BO_1		(3, 5, 8, 9, 15, 16, 17, 19, 32, 35, 90, 92)
	BO_2		
	BO_5		
	BO_6		16
	BO_7		
	BO_8	(13, 128)	
Bunyon (BP)	BP_1		(3, 5, 8, 9, 15, 16, 17, 19, 32, 35, 90, 92)
	BP_2	1	
	BP_3		
	BP_5		
	BP_6		
	BP_7	1	
	BP_8	(13, 128)	
Champion (CH)	CH_1	1	16, (15, 19, 32, 35)
	CH_2	1, 9, 12	9, 12, 15, 79
	CH_7		
	CH_8	(13, 128)	
Clifty (CF)	CF_1		(15, 19, 32, 35)

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Columbine (CM)	CM_1	7, 10, 11, 12	10, 12, 20, 31, 43, (1, 5, 9, 14, 15, 16, 18, 22, 30, 32)
	CM_2	9, 13, 14, 30, 37	9, 14, 19, 26, 30, 37
	CM_3	14	14
	CM_4	11	
	CM_7		8, 132
	CM_8	3, 7, 9, 13, 14, 129	9, 14
Connor (CZ)	CZ_1		(1, 5, 8, 9, 10, 15, 22, 24, 30)
	CZ_2		
	CZ_3		
	CZ_4	8	
	CZ_7		
	CZ_8	13, (128)	
Conrad (CI)	CI_1	1, 67	15, 19, 44, 45, 67, (9, 16, 32, 35)
	CI_2	1, 8, 10	8, 10, 16
	CI_3		
	CI_4	12	12, 35
	CI_7		
	CI_8	13, (128)	
Corrigan (CQ)	CQ_1		(15, 16, 19, 26, 32, 35)
	CQ_2	11	
	CQ_3		
	CQ_4		19
	CQ_7		
	CQ_8	(13, 128)	

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Couldrey (CY)	CY_1	1,8, 9, 11	8, 9, (1, 5, 12, 14, 15, 16, 18, 22, 30, 32)
	CY_2	1	15, 92
	CY_3	1	
	CY_4		35
	CY_7		
	CY_8	1, 7, 128, (13)	15, 16, 18
Crossing (CS)	CS_1	12	12, (1, 5, 12, 14, 15, 16, 18, 22, 30, 32)
	CS_2	8, 12, 37	8, 12, 16, 31, 39
	CS_3	12	12
	CS_4		
	CS_7		
	CS_8	(13, 128)	
Ferster (FE)	FE_1	112, (75, 76)	(33, 73)
	FE_2		
	FE_{10}		
	FE_{11}		
Festubert (FV)	FV_1	127, (75, 76, 112)	34, (33)
	FV_2	126	73
	FV_{10}		
	FV_{11}	127	
Fire Mountain (FJ)	FJ_1	(75, 76, 112, 127)	(33, 73)
	FJ_2		
	FJ_{10}		
	FJ_{11}	(127)	

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
George (GE)	GE_1		(25, 29, 33, 47, 75, 76)
	GE_2		
	GE_3		
	GE_4		
	GE_7		
	GE_8	(13, 129)	
	GE_{10}		
Gold Creek (GL)	GL_1		15, 31, 46, (19, 49, 55, 57, 59, 65, 66)
	GL_2	132	
	GL_3		(64)
	GL_7		
	GL_8		
Grizzly (GZ)	GZ_1	3	(25, 29, 33, 34, 47, 75, 76)
	GZ_2	24	
	GZ_3		
	GZ_4		34
	GZ_7		
	GZ_8	(13, 129)	
	GZ_{10}		
Gydosic (GC)	GC_1		(15, 19, 31, 46, 55, 57, 59, 65, 66)
	GC_2	10	10, 31, 35
	GC_3		(64)
	GC_4		
	GC_7		
	GC_8		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Kingcome (KG)	KG_1	3, 12, 14	12, 14, 21, 35, (15, 19, 31, 46, 55, 57, 59, 65, 66)
	KG_2	25, 30	25, 30, 32, 35, 56
	KG_3		39, (64)
	KG_4	3	
	KG_7		
	KG_8	8	8
Linten (LL)	LL_1	3, 14, 116, (112, 127)	14, (25, 29, 33, 47, 75, 76)
	LL_2		
	LL_4		
	LL_7		
	LL_8	(13, 129)	
Maguire (MR)	MR_1	1	(9, 15, 22, 23, 32)
	MR_2	8	8
	MR_4	1, 9, 10, 37, 132, 133	9, 10, 15, 37
	MR_5		
	MR_7		
	MR_8	(13, 128)	
Marconi (MC)	MC_1	1, 8, 12, 14	8, 12, 14, 20, 21, 26, 31, 45, (9, 15, 22, 23, 27)
	MC_2	9, 12, 25	9, 12, 23, 25
	MC_3	1, 3	
	MC_4	3	
	MC_5	7	19
	MC_7	1, 2, 3, 4, 6, 132	
	MC_8	6, (13, 128)	

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
McCorn (ML)	ML_1		(9, 15, 22, 23, 32)
	ML_2		21
	ML_4		17, 35
	ML_5		55
	ML_7		
	ML_8	(13, 128)	(13, 128)
McQuaigly (MG)	MG_1	11	15, (9, 15, 22, 23, 32)
	MG_2		15, 18, 43, 49, 51
	MG_3	24	
	MG_4		
	MG_5		
	MG_7		
	MG_8	(13, 128)	
McKay Mountain (MX)	MX_1	1, 3, 14	14, 39, (8, 9, 12, 15, 20, 21, 23, 26, 27, 45)
	MX_2		
	MX_4		
	MX_5		
	MX_7		
	MX_8	(13, 128)	
Melbert (ME)	ME_1	25	25, 29, (9, 12, 14, 15, 22, 24, 32)
	ME_2		34
	ME_4		29
	ME_5	10, 12	10, 12
	ME_7		
	ME_8	(13, 128)	

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Minitown (MN)	MN_1	3, 14	14, 18, (9, 15, 22, 26, 32)
	MN_2		
	MN_3	1, 5	
	MN_4		34, 55, 57
	MN_5		19
	MN_7		
	MN_8	(13, 128)	
Odlumby (OD)	OD_1	70, 127	
	OD_{11}		
Rainbowl (RG)	RG_1		(3, 5, 8, 10, 12, 15, 16, 17, 19, 32, 35, 90, 92)
	RG_2		
	RG_3		
	RG_4		
	RG_5	1, 9	9, 15, 16
	RG_6		
	RG_7	5	
	RG_8	1, (13, 128)	
Rocky Ridge (RK)	RK_1		(3, 5, 8, 10, 12, 15, 16, 17, 19, 32, 35, 90, 92)
	RK_2		
	RK_3		
	RK_4		
	RK_5		
	RK_6		
	RK_7		
	RK_8	(13, 128)	

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Roth Creek (RN)	RN_1		(3, 5, 8, 10, 12, 15, 16, 17, 19, 32, 35, 90, 92)
	RN_2		15, 17, 49
	RN_3		
	RN_4		45
	RN_5		
	RN_6		
	RN_7		17, 90, 92
	RN_8	(13, 128)	
Rourke (RF)	RF_1		(3, 5, 8, 9, 15, 16, 17, 19, 32, 35, 90, 92)
	RF_2		
	RF_3		
	RF_5		
	RF_6		
	RF_7		
	RF_8	(13, 128)	
Rualt (RT)	RT_1	1	(3, 5, 8, 9, 15, 16, 19, 21, 23, 27, 32, 35, 90, 92)
	RT_2		
	RT_3	14	14
	RT_5		
	RT_6		
	RT_7		
	RT_8	1, (13, 128)	
Sandon (SN)	SN_1		(15, 19, 32, 35)
	SN_2		35
	SN_4		35

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

Table B.5 (Continued)
LODGEPOLE PINE - WHITEBARK PINE SUBZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Sandon (cont'd)	SN_5		
	SN_8	(13, 128)	
Yahk Creek (YK)	YK_1	1	
	YK_9		
	YK_{10}		
	YK_{11}		
Ymir (YR)	YR_1		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.6
SOIL ASSOCIATION COMPONENTS AND THEIR ASSOCIATED VEGETATION TYPES FOR THE KRUMMHOLZ SUBZONE OF THE SUBALPINE ENGELMANN SPRUCE - ALPINE FIR ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Coyote Creek (COY)	COY_1	(1, 134)	(5, 133)
	COY_2	134	133
	COY_7	130	
	COY_8	(13, 128)	
Morrow Mountain (MP)	MP_1	(1, 134)	(133)
	MP_2		133
	MP_3	(8, 116, 131, 132)	
	MP_4		
	MP_5		
	MP_7		
	MP_8	(13, 128)	132
Radium (RA)	RA_1	6, (134)	(2, 3, 4, 5, 6, 7, 133)
	RA_2	1, 2, 3, 5	90
	RA_3	1	
	RA_5	5	
	RA_6		
	RA_7		
	RA_8	133, (13, 128)	
Yahk Creek (YK)	YK_1	1	
	YK_9		
	YK_{10}		
	YK_{11}		
Ymir (YR)	YR_1		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

TABLE B.7
SOIL ASSOCIATION COMPONENTS AND THEIR ASSOCIATED VEGETATION TYPES FOR THE ALPINE TUNDRA ZONE

Soil Association[1]	Soil Association Component Map Symbol	Vegetation Types	
		Climax	Seral
Rock Lake (RJ)	RJ_1	(130, 133)	
	RJ_2		
	RJ_3		
	RJ_5		
	RJ_6		
	RJ_7	4	
	RJ_8		

[1] For descriptions of soil associations and their components see Biophysical Resources of the East Kootenay Area: Soils (Lacelle, in preparation).

APPENDIX C

VEGETATION TYPES AND PREVIOUS STUDIES

In Table C.1 and Table C.2 the vegetation types from the present study (which are described in Chapter Two) are related to previous studies in the surrounding area including Ogilvie (1962) for the east slopes of the Rocky Mountains in Alberta, Pfister and others (1977) for Montana, Daubenmire (1952, 1971) for northern Idaho and parts of Washington, Brayshaw (1965) for south-central British Columbia, McLean and Holland (1958) for the Columbia Valley (from Canal Flats to McNaughton Lake), Bell (1964) for the West Kootenay area, and Krajina (1970) for all of British Columbia.

Mature or climax Vegetation Types that are considered to have similar vegetation are listed from the plant associations of habitat types in Table C.1 and for the plant associations of biogeocoenoses in Table C.2. Other Vegetation Types are not listed in these tables either because they do not have similar vegetation to plant communities described from other studies or because the types are earlier seral communities which are not dealt with in other studies.

TABLE C.1
COMPARISON OF VEGETATION TYPES TO PLANT ASSOCIATIONS OF HABITAT TYPES

Plant Associations of Habitat Types (h.t.)	Source	Similar Vegetation Types[1]
Rocky Mountain Douglas-fir/mallow ninebark h.t.	Pfister and others (1977)	81, 85
Rocky Mountain Douglas-fir/northern twinflower h.t.	Pfister and others (1977)	60
Rocky Mountain Douglas-fir/common snowberry h.t.	Daubenmire (1952, 1971) Pfister and others (1977) Ogilvie (1962)	108
Rocky Mountain Douglas-fir/pine grass h.t.	Daubenmire (1952, 1971) Pfister and others (1977) Ogilvie (1962)	78, 80, 81, 82, 83, 85, 86, 100
Rocky Mountain Douglas-fir/rough fescue h.t.	Pfister and others (1977)	97
Western red cedar/devil's-club	Daubenmire (1952, 1971) Pfister and others (1977)	68
Western hemlock/blue-bead clintonia h.t.	Pfister and others (1977)	36, 68, 69
Western red cedar/Oregon boxwood h.t.	Daubenmire (1952, 1971)	44
Western hemlock/Oregon boxwood h.t.	Daubenmire (1952, 1971)	36
Spruce/common horsetail h.t.	Pfister and others (1977) Ogilvie (1962)	33, 112, 113
Spruce/blue-bead clintonia h.t.	Pfister and others (1977)	67, 76
Spruce/dwarf blueberry h.t.	Pfister and others (1977)	57
White spruce/pine grass h.t.	Ogilvie (1962)	57
Alpine fir/blue-bead clintonia h.t.	Pfister and others (1977)	38, 64
Alpine fir/smooth Pacific menziesia h.t.	Daubenmire (1952, 1971) Pfister and others (1977) Ogilvie (1962)	9, 10, 11, 23, 25, 28, 34
Engelmann spruce/alpine fir/smooth Pacific menziesia/unifoliate-leaved foamflower h.t.	Ogilvie (1962)	12
Alpine fir/dwarf blueberry h.t.	Pfister and others (1977)	41, 57, 59, 62
Alpine fir/northern twinflower h.t.	Pfister and others (1977)	20, 31, 47, 66
Alpine larch/alpine fir h.t.	Pfister and others (1977)	133
Whitebark pine/alpine fir h.t.	Pfister and others (1977)	5, 134
Alpine fir/Oregon boxwood h.t.	Daubenmire (1952, 1977)	36, 44
Engelmann spruce/alpine fir/common cow parsnip/horsetail h.t.	Ogilvie (1962)	112

TABLE C.2
COMPARISON OF VEGETATION TYPES TO PLANT ASSOCIATIONS OF BIOGEOCOENOSES

Plant Associations of Biogeocoenoses	Source	Similar Vegetation Types[1]
Rocky Mountain Douglas-fir/ponderosa pine/pine grass/bluebunch wheatgrass/moss	Krajina (1970)	97, 103
Rocky Mountain Douglas-fir/ponderosa pine/kinnikinnick/pine grass/moss	Krajina (1970) Brayshaw (1965) Bell (1964)	78, 80, 85, 100
Western red cedar/Rocky Mountain Douglas-fir/devil's-club/unifoliate-leaved foamflower/moss	Krajina (1970) Bell (1964)	68
Engelmann spruce/lodgepole pine/blue-bead clintonia/feather moss/common moss	Krajina (1970)	38
Engelmann spruce/alpine fir/grouseberry/pine grass/kinnikinnick/lichens	Krajina (1970)	31
Engelmann spruce/alpine fir/whitebark pine/alpine larch/mountain-heather/grouseberry/lichens	Krajina (1970)	133, 134

[1] For descriptions of the Vegetation Types see Volume Three of this report.

APPENDIX D

SPECIES LIST

This is a list of the plant and animal species mentioned in the report. The plant species are listed alphabetically by tree species, shrub species, herb and dwarf shrub species,and moss layer. The list covers the more common species of the East Kootenay area as in the reconnaissance study only sites representative of larger areas were sampled. Unique habitats may not have been sampled. Moss species generally were not considered unless they were dominant. Data was used from several surveys and was collected by various surveyors. For this reason certain species were complexed at the genus level as identification was not certain at the species level. Nomenclature follows Taylor and MacBryde (1977), except for moss species in which common names have been standardized within the Vegetation Unit, Terrestrial Studies Branch.

The animal species are listed alphabetically by common name. Animal nomenclature follow Banfield (1974).

TREE SPECIES

Common Name	Botanical Name
alpine fir	Abies lasiocarpa
alpine larch	Larix lyallii
balsam poplar	Populus balsamifera subsp. balsamifera
black cottonwood	Populus balsamifera subsp. trichocarpa
common paper birch	Betula papyrifera
Engelmann spruce	Picea engelmannii
limber pine	Pinus flexilis
lodgepole pine	Pinus contorta
paper birch	Betula papyrifera
ponderosa pine	Pinus ponderosa
Rocky Mountain Douglas-fir	Pseudotsuga menziesii
spruce	Picea spp. (P. glauca x engelmannii)
trembling aspen	Populus tremuloides
western birch	Betula occidentalis
western hemlock	Tsuga heterophylla
western larch	Larix occidentalis
western red cedar	Thuja plicata
western white pine	Pinus monticola
white pine	Pinus monticola
white spruce	Picea glauca
whitebark pine	Pinus albicaulis

SHRUB SPECIES

alder-leaved buckthorn	Rhamnus alnifolius
American red raspberry	Rubus idaeus
antelopebush	Purshia tridentata
baldhip rose	Rosa gymnocarpa
big sagebrush	Artemisia tridentata
birch-leaved spirea	Spiraea betulifolia
black blueberry	Vaccinium membranaceum (includes V. globulare)
black swamp gooseberry	Ribes lacustre
blueberry	Vaccinium spp.
blue elder	Sambucus spp.
bristly Nootka rose	Rosa nutkana
choke cherry	Prunus virginiana
common juniper	Juniperus communis

SHRUB SPECIES (CONTINUED)

Common Name	Botanical Name
common Labrador tea	Ledum groenlandicum
common rabbitbrush	Chrysothamnus nauseosus
common saskatoon	Amelanchier alnifolia
common snowberry	Symphoricarpos albus
creeping Oregon-grape	Mahonia repens (includes M. aquifolium)
currant	Ribes spp.
devil's-club	Oplopanax horridus
diamond willow	Salix glauca
glandular birch	Betula glandulosa
gooseberry	Ribes spp.
high bush cranberry	Viburnum edule
huckleberry	Vaccinium spp.
hoary willow	Salix candida
mallow ninebark	Physocarpus malvaceus
Oregon boxwood	Paxistima myrsinites
pin cherry	Prunus pensylvanica
prairie sagebrush	Artemisia frigida
prickly rose	Rosa acicularis
redstem ceanothus	Ceanothus sanguineus
Rocky Mountain juniper	Juniperus scopulorum
Rocky Mountain maple	Acer glabrum
roses	Rosa spp.
Scouler's willow	Salix scouleriana
shrubby cinquefoil	Potentilla fruticosa
Sitka mountain alder	Alnus viridis subsp. sinuata
Sitka mountain-ash	Sorbus sitchensis
snowberry	Symphoricarpos spp.
snowbush ceanothus	Ceanothus velutinus
smooth Pacific menziesia	Menziesia ferruginea
soopolallie	Shepherdia canadensis
tall Oregon-grape	Mahonia aquifolium
thin-leaved mountain alder	Alnus incana
twinberry honeysuckle	Lonicera involucrata
Utah honeysuckle	Lonicera utahensis

SHRUB SPECIES (CONTINUED)

Common Name	Botanical Name
western birch	Betula occidentalis
western blue clematis	Clematis occidentalis
western red-osier dogwood	Cornus sericea
western snowberry	Symphoricarpus occidentalis
western thimbleberry	Rubus parviflorus
western yew	Taxus brevifolia
white-flowered rhododendron	Rhododendron albiflorum
willows	Salix spp. (generally S. scouleriana in forested habitats)
Woods' rose	Rosa woodsii

HERB AND DWARF SHRUB SPECIES (HERB LAYER)

alpine bistort	Bistorta vivipara
alpine blue grass	Poa alpina
alpine fescue	Festuca brachyphylla
alpine Indian paintbrush	Castilleja rhexifolia
alpine milk-vetch	Astragalus alpina
alpine timothy	Phleum alpinum
alpine willowherb	Epilobium anagallidifolium
American alpine smelowskia	Smelowskia calycina
American stinging nettle	Urtica dioica
American vetch	Vicia americana
arrow-leaved balsamroot	Balsamorhiza sagittata
arrow-leaved ragwort	Senecio triangularis
asters	Aster spp.
beardless bluebunch wheat grass	Agropyron inerme
beardtongues	Penstemon spp.
bear-grass	Xerophyllum tenax
Bellard's kobresia	Kobresia myosuroides
bent grasses	Agrostis spp.
bitterroot lewisia	Lewisia rediviva
black alpine sedge	Carex nigricans
black-tipped ragwort	Senecio lugens
blue-bead clintonia	Clintonia uniflora
bluebunch wheat grass	Agropyron spicatum
blue grasses	Poa spp.
blue-leaved cinquefoil	Potentilla diversifolia
bracted lousewort	Pedicularis bracteosa
broad-leaved arnica	Arnica latifolia
broad-leaved willowherb	Epilobium latifolium
brome grasses	Bromus spp.
brown-eyed Susan	Gaillardia aristata
brown-haired orange-flowered arnica	Arnica fulgens

HERB AND DWARF SHRUB SPECIES (HERB LAYER) (CONTINUED)

Common Name	Botanical Name
bulrushes	Scirpus spp.
Canadian bunchberry	Cornus canadensis
Canada violet	Viola canadensis
cattail	Typha latifolia
chickweeds	Cerastium spp.
clovers	Trifolium spp.
Columbia bladderpod	Lesquerella douglasii
Columbia brome grass	Bromus vulgaris
Columbia gromwell	Lithospermum ruderale
Columbia lily	Lilium columbianum
common cattail	Typha latifolia
common cow-parsnip	Heracleum sphondylium
common dandelion	Taraxacum officinale
common harebell	Campanula rotundifolia
common horsetail	Equisetum arvense
common lady fern	Athyrium filix-femina
common mitrewort	Mitella nuda
common pearly everlasting	Anaphalis margaritacea
common pink pyrola	Pyrola asarifolia
common silverweed	Potentilla anserina
common timothy	Phleum pratensis
common western pipsissewa	Chimaphila umbellata
cream-coloured peavine	Lathyrus ochroleucus
cream mountain-heather	Phyllodoce glanduliflora
creek goldenrod	Solidago canadensis
creeping sibbaldia	Sibbaldia procumbens
cucumberroot twistedstalk	Streptopus amplexifolius
Cusick's speedwell	Veronica cusickii
death-camas	Zigadenus venenosus
delphiniums	Delphinium spp.
desert parsley	Lomatium ambiguum
Douglas' aster	Aster subspicatus
drooping brome grass	Bromus tectorum
Drummond's rush	Juncus drummondii
dusky brown pussytoes	Antennaria umbrinella
dwarf blueberry	Vaccinium caespitosum
dwarf red blackberry	Rubus pubescens
dwarf scouring-rush	Equisetum scirpoides
dwarf spike-rush	Eleocharis parvula
early blue violet	Viola adunca
elegant death-camas	Zigadenus elegans
evergreen yellow violet	Viola orbiculata

HERB AND DWARF SHRUB SPECIES (HERB LAYER) (CONTINUED)

Common Name	Botanical Name
fairyslipper	Calypso bulbosa
false bugbane	Trautvetteria caroliniensis
false Solomon's-seal	Smilacina racemosa
fescues	Festuca spp.
few-flowered one-sided wintergreen	Orthilia secunda
few-flowered shooting star	Dodecatheon pulchellum
field chickweed	Cerastium arvense
field locoweed	Oxytropis campestris
field mint	Mentha arvensis
field pussytoes	Antennaria neglecta
fireweed	Epilobium angustifolium
five-leaved creeping raspberry	Rubus pedatus
fleabanes	Erigeron spp.
goldenweeds	Haplopappus spp.
graceful cinquefoil	Potentilla gracilis
green false hellebore	Veratrum viride
green pyrola	Pyrola chlorantha
grouseberry	Vaccinium scoparium (includes V. myrtillus)
hair grasses	Deschampsia spp.
hairy arnica	Arnica mollis
hairy golden-aster	Heterotheca villosa
hawkweeds	Hieraceum spp. (mainly H. albiflorum)
heart-leaved arnica	Arnica cordifolia
heart-leaved twayblade	Listera cordata
Holboell's rock cress	Arabis holboellii
hooded ladies-tresses	Spiranthes romanzoffiana
Hood's phlox	Phlox hoodii
Hooker's fairybells	Disporum hookeri
horsetails	Equisetum spp.
Idaho fescue	Festuca idahoensis
Indian paintbrushes	Castilleja spp. (generally C. miniata; may include C. occidentalis and C. rhexifolia at high elevations)
inland blue grass	Poa interior
Kentucky blue grass	Poa pratensis
kinnikinnick	Arctostaphylos uva-ursi
lance-leaved stonecrop	Sedum lanceolatum
large-leaved rattlesnake orchid	Goodyera oblongifolia
locoweeds	Oxytropis spp.
low bilberry	Vaccinium myrtillus
low pussytoes	Antennaria dimorpha

HERB AND DWARF SHRUB SPECIES (HERB LAYER) (CONTINUED)

Common Name	Botanical Name
lupines	Lupinus spp. (generally L. sericeus in low elevation habitats)
Lyall's goldenweed	Haplopappus lyallii
Lyall's phacelia	Phacelia lyallii
Merten's cassiope	Cassiope mertensiana
moss campion	Silene acaulis
mountain forget-me-not	Myosotis asiatica
mountain-heathers	Phyllodoce spp.
mountain sweetcicely	Osmorhiza chilensis
mountain vahlodea	Vahlodea atropurpurea
narrow-leaved lomatium	Lomatium triternatum
narrow-leaved stephanomeria	Stephanomeria tenuifolia
needle grasses	Stipa spp.
needle-and-thread grass	Stipa comata
nodding onion	Allium cernuum
northern bedstraw	Galium boreale
northern gentian	Gentianella amarella
northern goldenrod	Solidago multiradiata
northern hedysarum	Hedysarum boreale
northern red-fruited comandra	Geocaulon lividum
northern small reed grass	Calamagrostis inexpansa
northern twinflower	Linnaea borealis
northwestern sedge	Carex concinnoides
Nuttall's pussytoes	Antennaria parvifolia
oak fern	Gymnocarpium dryopteris
old man's whiskers	Geum triflorum
one-flowered cinquefoil	Potentilla uniflora
one-flowered wintergreen	Moneses uniflora
Pacific anemone	Anemone multifida
palmate colt's-foot	Petasites palmatus
parsnip-flowered umbrellaplant	Erigonum heracleoides
penstemons	Penstemon spp.
pine grass	Calamagrostis rubescens
pink microsteris	Microsteris gracilis
poverty oat grass	Danthonia spicata
prairie crocus	Pulsatilla patens
prairie koeleria	Koeleria macrantha
prairie sagebrush	Artemisia frigida
pussytoes	Antennaria spp.
quack grass	Agropyron repens

HERB AND DWARF SHRUB SPECIES (HERB LAYER) (CONTINUED)

Common Name	Botanical Name
racemose pussytoes	Antennaria racemosa
ragworts	Senecio spp.
red baneberry	Actaea rubra
red mountain-heather	Phyllodoce empetriformis
Ricnardson's crane's-bill	Geranium richardsonii
Richardson's needle grass	Stipa richardsonii
Rocky Mountain ragwort	Senecio streptanthifolius
rosy pussytoes	Antennaria microphylla
rough fescue	Festuca scabrella
rough-fruited fairybells	Disporum trachycarpum
rough-leaved rice grass	Oryzopsis asperifolia
round-leaved alumroot	Heuchera cylindrica
rushes	Juncus spp.
Sandberg's blue grass	Poa sandbergii
scouring-rush	Equisetum spp.
sedges	Carex spp.
selaginellas	Selaginella spp.
shaggy fleabane	Erigeron pumilis
short-beaked false dandelion	Agoseris glauca
showy aster	Aster conspicuus
sickle-top lousewort	Pedicularis racemosa
silky lupine	Lupinus sericeus
Sitka valerian	Valeriana sitchensis
slender hawk's-beard	Crepis atrabarba
slender wheat grass	Agropyron pauciflorum
small-flowered blue-eyed Mary	Collinsia parviflora
small-flowered bulrush	Scirpus microcarpus
small western needle grass	Stipa occidentalis
smooth aster	Aster laevis
spike-like goldenrod	Solidago spathulata
spike trisetum	Trisetum spicatum
spiny shield fern	Dryopteris assimilis
spreading dogbane	Apocynum androsaemifolium
spreading phlox	Phlox diffusa
star-flowered false Solomon's-seal	Smilacina stellata
stiff club-moss	Lycopodium annotinum
subalpine buttercup	Ranunculus eschscholtzii
subalpine fleabane	Erigeron peregrinus
sulphur hedysarum	Hedysarum sulphurescens
sweet-scented bedstraw	Galium triflorum
thistles	Cirsium spp.
thread-leaved sandwort	Arenaria capillaris
three-spot mariposa lily	Calochortus apiculatis
timber milk-vetch	Astragalus miser
tufted phlox	Phlox caespitosa

HERB AND DWARF SHRUB SPECIES (HERB LAYER) (CONTINUED)

Common Name	Botanical Name
umbrellaplant	Eriogonum spp.
unifoliate-leaved foamflower	Tiarella unifoliata
violets	Viola spp.
western Indian paintbrush	Castilleja occidentalis
western meadow-rue	Thalictrum occidentale
western mountainbells	Stenanthium occidentale
western needle grass	Stipa occidentalis
western pasqueflower	Pulsatilla occidentalis
western spring beauty	Claytonia lanceolata
western white clematis	Clematis ligusticifolia
western yarrow	Achillea millefolium
wheat grasses	Agropyron spp.
white hawkweed	Hieracium albiflorum
white mountain-avens	Dryas octopetala
wild chive	Allium schoenoprasum
wild flax	Linum perenne
wild rye grasses	Elymus spp.
wild sarsaparilla	Aralia nudicaulis
wild strawberry	Fragaria virginiana
wood-rushes	Luzula spp.
wood strawberry	Fragaria vesca
woolly plantain	Plantago patagonica
woolly pussytoes	Antennaria lanata
yellow columbine	Aquilegia flavescens
yellow glacier lily	Erythronium grandiflorum
yellow mountain-avens	Dryas drummondii
yellow penstemon	Penstemon confertus
yellow salsify	Tragopogon dubius
yellow wood violet	Viola glabella

MOSS LAYER (MOSS, LICHENS AND LIVERWORTS)

Common Name	Botanical Name
arboreal lichens	Alectoria spp., Usnea spp. (lichens growing on tree branches)
brachythecium mosses	Brachythecium spp.
common moss	Pleurozium schreberi
cushion mosses	Dicranum spp.
feather moss	Ptilium crista-castrensis
fruticose lichens	Cladonia spp.

MOSS LAYER (MOSS, LICHENS AND LIVERWORTS (CONTINUED)

Common Name	Botanical Name
hairy-cap mosses	Polytrichum spp.
layered moss	Hylocomium splendens
mnium mosses	Mnium spp.
sheet lichens	Peltigera spp.
small cushion moss	Dicranum fuscescens
spnagnum mosses	Sphagnum spp.

D.2 ANIMAL SPECIES

Common Name	Scientific Name
elk	Cervus elaphus nelsonii
moose	Alces alces andersoni and A.a. shirasi
mountain goat	Oreamnus americanus
mule deer	Odocoileus hemionus hemionus
Rocky Mountain bighorn sheep	Ovis canadensis canadensis
white-tailed deer	Odocoileus virginianus ochrourus
woodland caribou	Rangifer tarandus caribou

APPENDIX E

UNGULATE FORAGE USE[1] IN THE EAST KOOTENAY AREA

The East Kootenay area is noted for having large numbers of wild ungulates, this in part is due to the diversity of big game species which occupy similar ranges in either the summer or winter periods; and it is also due to the juxtaposition of favourable winter, spring/fall and summer ranges. The species of big game include elk, mule deer, white-tailed deer, Rocky Mountain bighorn sheep, mountain goat, moose and woodland caribou.

With this diversity of wild ungulates, plus domestic cattle, and their use of different habitats for different seasons, it is to be expected that within the study area a wide variety of plants are used as forage. It is difficult to make generalizations of plants used as forage for each ungulate species, however, the following tables (Table E.1 to E.3) list the more important feed plants.

Generally, cattle, bighorn sheep and elk forage on grasses, sedges and forbs and consume little browse; white-tailed deer, mule deer and moose consume browse and forbs and very little grass or sedge; mountain goats consume sedges, grasses and forbs in the summer and sedges, grasses and browse in the winter; and caribou forage on forbs and browse during the summer and arboreal lichens in the winter.

White-tailed deer eat primarily the leaves of browse, so that in winter they switch from forbs and deciduous shrub leaves to Rocky Mountain Douglas-fir, kinnikinnick, creeping Oregon-grape and Hood's phlox. Thus they maintain a diet of green vegetation year round. Mule deer consume forbs, and the leaves and stems of browse during the summer and forage on the twigs of the deciduous browse plus Rocky Mountain Douglas-fir, kinnikinnick and creeping Oregon-grape and snowbush ceanothus. Therefore, they do not maintain a strictly green diet as do the white-tailed deer.

In determining the use and value of various plants to various ungulate species, availability is often as important as palatability or nutritional value. A plant species that is highly abundant but is not necessarily highly palatable may not be actively pursued but can be consumed because an animal is passing by that plant (i.e. snowberry, Rocky Mountain Douglas-fir, antelope-bush). Highly palatable species of low abundance may be actively sought after and often consumed by all ungulate species (i.e. saskatoon, choke cherry, roses or bunch grass in early stages of growth). Thus, without controlled feeding studies it is difficult to make specific comments about the value of individual plant species.

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[1] Author: Dennis A. Demarchi, Wildlife Biologist, Terrestrial Studies Branch, September, 1978.

The tables presented consider three different areas in the landscape, those areas with seral ponderosa pine (Table E.1), those areas with seral lodgepole pine in the Rocky Mountain Douglas-fir zone as well as areas with seral Douglas-fir in the Engelmann spruce - alpine fir zone (Table E.2), and the upper areas of the Subalpine Engelmann spruce - alpine fir zone as well as the Alpine tundra zone (Table E.3). Each table is divided into Winter - Spring Use and Summer - Autumn Use. Only those animals that will occur in that particular area of the landscape are presented for each table.

TABLE E.1
FORAGE OF AREAS WITH SERAL PONDEROSA PINE: SEASONAL UTILIZATION BY UNGULATE SPECIES

<table>
<tr><th colspan="5">Winter-Spring Use</th></tr>
<tr><th>Elk</th><th>White-tailed Deer</th><th>Mule Deer</th><th>Bighorn Sheep</th><th>Cattle</th></tr>
<tr><td>grass species
rough fescue
bluebunch wheat grass
Idaho fescue
prairie koeleria
Kentucky blue grass
alfalfa
cultivated hay
common saskatoon
antelopebush
parsnip-flowered umbrellaplant</td><td>anything that's green
kinnikinnick
Rocky Mountain Douglas-fir
pussytoes
Hood's phlox
creeping Oregon-grape</td><td>kinnikinnick
Rocky Mountain Douglas-fir
pussytoes
Hood's phlox
creeping Oregon-grape
prairie sagebrush
common rabbitbrush
antelopebush
common saskatoon
roses
balsamroot (flowers)
parsnip-flowered umbrellaplant
choke and pin cherry</td><td>rough fescue
bluebunch wheat grass
prairie sagebrush
blue grass</td><td>not on the range in the winter</td></tr>
<tr><th colspan="5">Summer-Autumn Use</th></tr>
<tr><th>Elk</th><th>White-tailed Deer</th><th>Mule Deer</th><th>Bighorn Sheep</th><th>Cattle</th></tr>
<tr><td>generally at higher altitudes</td><td>common saskatoon
western red-osier dogwood
choke cherry
trembling aspen
common horsetail
roses</td><td>generally at higher altitudes</td><td>generally at higher altitudes</td><td>grasses
wheat grass
pine grass
needle grasses
roses
common saskatoon
some herbs
lupines
timber milk-vetch</td></tr>
</table>

TABLE E.2

FORAGE WITHIN THE LODGEPOLE PINE SUBZONE OF THE INTERIOR ROCKY MOUNTAIN DOUGLAS-FIR ZONE AND THE ROCKY MOUNTAIN DOUGLAS-FIR - LODGEPOLE PINE SUBZONE OF THE SUBALPINE ENGELMANN SPRUCE - ALPINE FIR ZONE: SEASONAL UTILIZATION BY UNGULATE SPECIES

Winter-Spring Use				
Elk	White-tailed Deer	Mule Deer	Bighorn Sheep	Moose
grasses rough fescue Idaho fescue bluebunch wheat grass blue grasses common saskatoon redstem ceanothus roses trembling aspen Rocky Mountain maple western red-osier dogwood	Rocky Mountain Douglas-fir kinikinnick creeping Oregon-grape Hood's phlox pussytoes choke cherry western red-osier dogwood	Rocky Mountain Douglas-fir kinnikinnick creeping Oregon-grape Hood's phlox pussytoes roses common saskatoon redstem ceanothus snowbush ceanothus trembling aspen prairie sagebrush common rabbitbrush antelopebush choke cherry western red-osier dogwood umbrellaplant	bluebunch wheat grass rough fescue Idaho fescue blue grasses prairie sagebrush common rabbitbrush umbrellaplant minor amounts of browse including: common saskatoon roses kinnikinnick Rocky Mountain Douglas-fir	western red-osier dogwood willows trembling aspen black cottonwood roses
Summer-Autumn Use				
Elk	White-tailed Deer	Mule Deer	Bighorn Sheep	Moose
grasses blue grasses rough fescue bluebunch wheat grass sedges pine grass common saskatoon willows trembling aspen alder roses	common saskatoon western red-osier dogwood roses choke cherry trembling aspen redstem ceanothus	common saskatoon western red-osier dogwood roses choke cherry trembling aspen Rocky Mountain maple lupines blueberry huckleberry arrow-leaved balsamroot (flowers)	limited summer use grasses forbs minor amounts of browse including: willow common saskatoon alpine fir Oregon boxwood	roses western red-osier dogwood willows trembling aspen black cottonwood sedges aquatic plants

(Spring-Early Summer)
Cattle
bluebunch wheat grass pine grass common saskatoon roses choke cherry antelopebush lupines timber milk-vetch American vetch cream-coloured peavine
Cattle
grasses wheat grass pine grass blue grasses needle grasses roses common saskatoon herbs lupines timber milk-vetch

TABLE E.3

FORAGE WITHIN THE LODGEPOLE PINE - WHITEBARK PINE SUBZONE AND THE KRUMMHOLZ SUBZONE OF THE SUBALPINE ENGELMANN SPRUCE - ALPINE FIR ZONE, AND THE ALPINE TUNDRA ZONE: SEASONAL UTILIZATION BY UNGULATE SPECIES

Summer-Autumn Use					
Elk	White-tailed Deer	Mule Deer	Bighorn Sheep	Moose	Mountain Goat
grasses sedges forbs	rare in this area	kinnikinnick common saskatoon alpine fir Oregon boxwood roses alpine blue grass alpine fescue sedges willows forbs	grasses forbs sedges fescues blue grass alpine timothy Oregon boxwood common saskatoon willows *wild rye grass *wheat grass	western red-osier dogwood willows trembling aspen roses black cottonwood	grasses sedges forbs alpine fir Oregon boxwood *wheat grass *wild rye grass

* avalanche chutes